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Restriction on the Placement of Nonhazardous Liquids in Hazardous Waste Landfills Statutory Interpretative Guidance

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Section 3004(c)(3) of HSWA restricts the placement of nonhazardous liquids in hazardous waste (Subtitle C) landfills. Such placement is allowed only when it will not present a risk of contamination to any underground source of drinking water, and when there is no placement alternative other than another landfill that contains or may contain hazardous waste or an unlined impoundment that contains or may contain hazardous waste.

Owners and operators of landfills regulated under Subtitle C of the Resource Conservation and Recovery Act are not subject to the prohibition when the following situations occur: 1) the nonhazardous liquids are absorbed and the material passes the Paint Filter Liquids Test prior to placement in the hazardous waste landfill, or 2) the nonhazardous liquids are used in the hazardous waste landfill to meet other regulatory or safety requirements. The guidance provides information about those situations that are not subject to the prohibition, and describes information that should be submitted to EPA by the owner/operator as part of the demonstration under §3004(c)(3) to qualify for an exemption from the prohibition. In addition, the guidance describes procedures for processing exemption requests, and the appendices provide reference material for assisting owners/operators in selecting alternative treatment methods, and in making other relevant determinations.

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RESTRICTION ON THE PLACEMENT OF NONHAZARDOUS LIQUIDS IN HAZARDOUS WASTE LANDFILLS

STATUTORY INTERPRETATIVE GUIDANCE

(April 1986)

Land Disposal Branch
Office of Solid Waste
U.S. Environmental Protection Agency

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Policy Directive No. 9487.01-A(85)

EXECUTIVE SUMMARY*

Section 3004(c)(3) of HSWA restricts the placement of non-hazardous liquids in hazardous waste (Subtitle C) landfills. Such placement is allowed only when it will not present a risk of contamination to any underground source of drinking water, and when there is no placement alternative other than another landfill that contains or may contain hazardous waste or an unlined impoundment that contains or may contain hazardous wastes.

The rules restricting the placement of nonhazardous liquids in hazardous waste landfills became effective on November 8, 1985. The Agency is issuing this guidance to ensure that owners and operators of landfills regulated under Subtitle C of the Resource Conservation and Recovery Act understand the legal requirements of this provision (which are presented in Section 2 of this guidance) and to provide assistance to owners or operators in complying with the provision (presented in Section 3 of this guidance).

The scope of the nonhazardous liquids (NHL's) provision and the overall demonstration process are explained in a flowchart, included as Exhibit 1. Owners/operators are not subject to the prohibition when the following situations occur:

1. NHL's are absorbed and the material passes the Paint Filter Liquids Test prior to placement in the hazardous waste landfill, or

2. NHL's are used in the hazardous waste landfill to to meet other regulatory or safety requirements:

   a. dust suppression
   b. fire fighting
   c. watering of vegetative cover
   d. moistening of clay cap
   e. washing of landfill equipment
   f. herbicide or pesticide treatment
   g. as part of an EPA-approved corrective action program (e.g. "landfill washing" or "soil flushing")

Section 2.B provides more information about those situations that are not subject to the prohibition.

An owner or operator who wishes an exemption in order to place NHL's into his hazardous waste landfill must make the demonstrations under §3004(c)(3). Section 3.C describes what information should be submitted to EPA beyond that already provided in a complete Part B permit application.

Sections 3.B and 3.E describe procedures for processing exemption requests. The appendices provide reference material for assisting owners or operators in selecting alternative treatment methods (Appendix A), in assessing whether hazardous wastes might be associated with certain industrial processes (Appendix B), and in determining whether an aquifer might be an Underground Source of Drinking Water (Appendix C).

*This guidance is subject to change based on comments received on 40 CFR 270.21(h)(2) and the nonhazardous liquids preamble language as part of the Proposed Codification Rule (51 FR 10706). The comment period closes on May 27, 1986.

1. Introduction

Subtitle C of the Resource Conservation and Recovery Act (RCRA) of 1976 created a management system to ensure that hazardous waste is safely treated, stored, and disposed of to ensure protection of human health and the environment.

On November 8, 1984, RCRA was amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA). Section 3004(c)(3) of HSWA addresses the placement of nonhazardous liquids (NHL's) in hazardous waste landfills (i.e., those landfills that are regulated under Subtitle C of RCRA). Section 3004(c)(3) states:

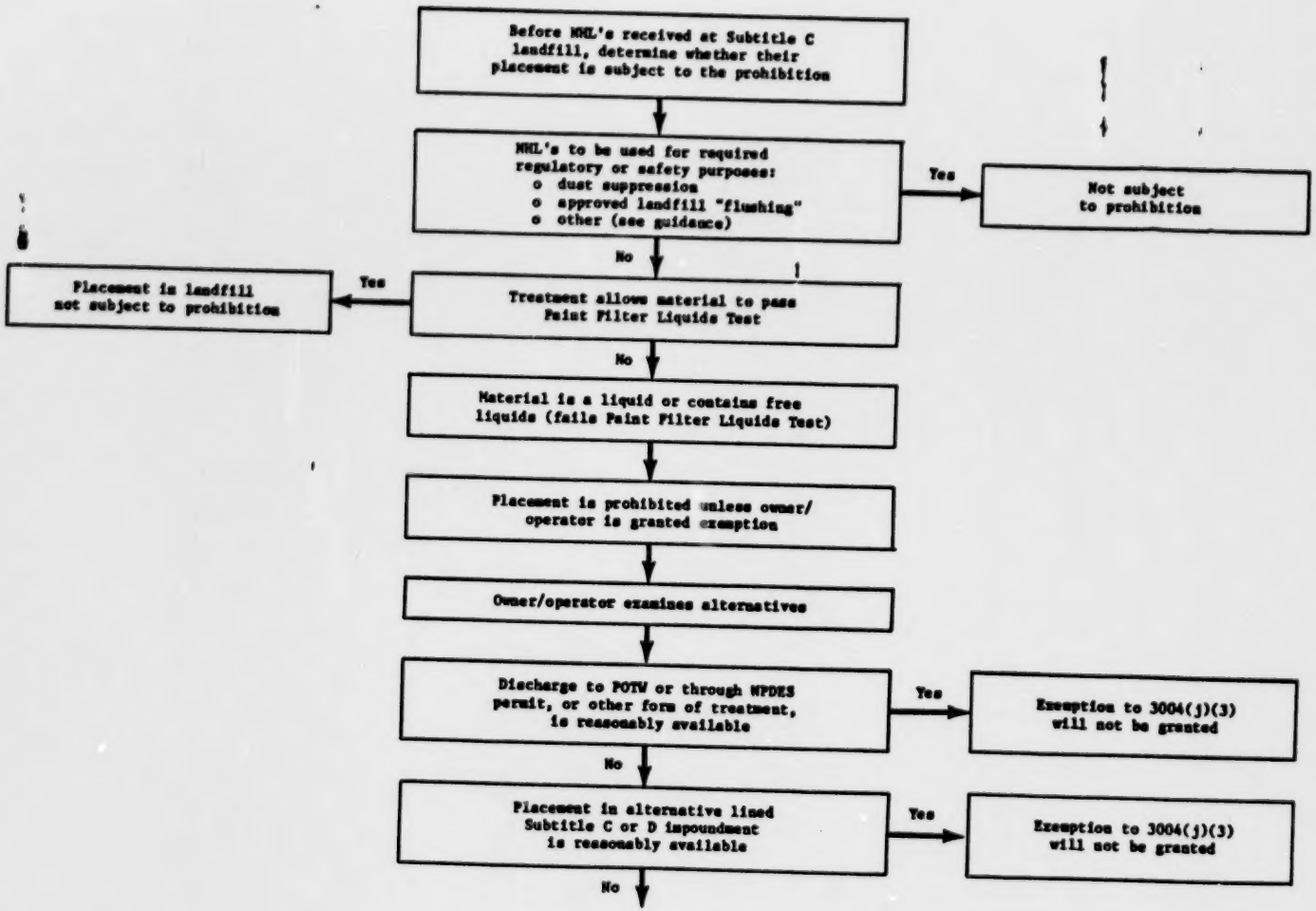
> Effective twelve months after the date of the enactment of the Hazardous and Solid Waste Amendments of 1984, the placement of any liquid which is not a hazardous waste in a landfill for which a permit is required under Section 3005(c) or which is operating pursuant to interim status granted under Section 3005(e) is prohibited unless the owner or operator of such landfill demonstrates to the Administrator, or the Administrator determines, that -
>
> A) the only reasonably available alternative to the placement in such landfill is placement in a landfill or unlined surface impoundment, whether or not permitted under Section 3005(c) or operating pursuant to interim status under Section 3005(e), which contains, or may reasonably be anticipated to contain, hazardous wastes; and,
>
> B) placement in such owner or operator's landfill will not present a risk of contamination of any underground source of drinking water.

On July 15, 1985, the Environmental Protection Agency (EPA) published in the Federal Register, as 40 CFR 264.314(e) and 265.314(f), the Final Codification Rule which addresses this provision (50 FR 28749). The rules are identical for permitted and interim status facilities:

> Effective November 8, 1985, the placement of any liquid which is not a hazardous waste in a landfill is prohibited unless the owner or operator of such landfill demonstrates

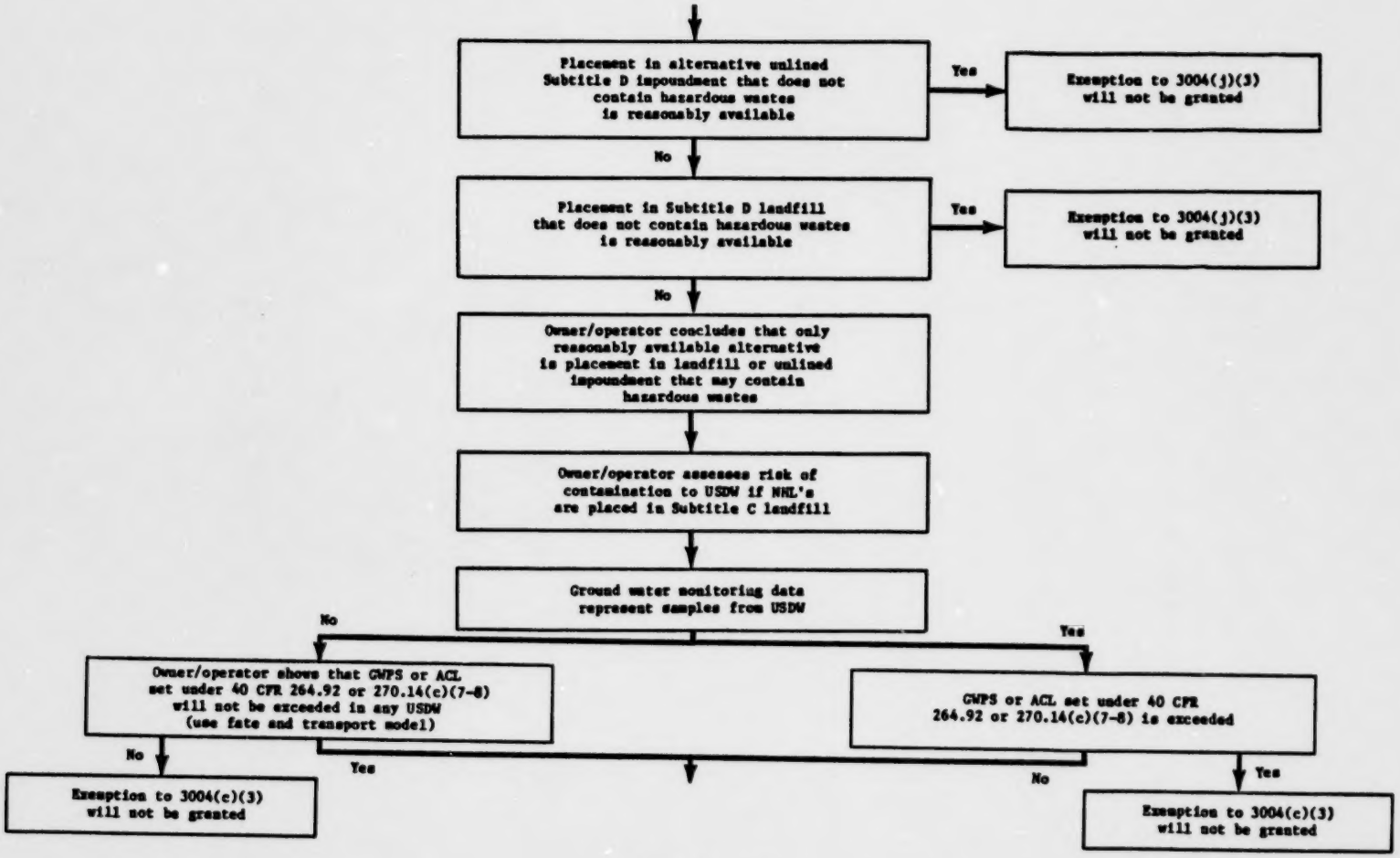
EXHIBIT 1

PROCESS TO DETERMINE WHETHER OWNER/OPERATOR SHOULD SEEK AN EXEMPTION TO THE PROHIBITION ON PLACEMENT OF NONHAZARDOUS LIQUIDS (NHL'S) IN SUBTITLE C LANDFILL*


Before NHL's received at Subtitle C landfill, determine whether their placement is subject to the prohibition
NHL's to be used for required regulatory or safety purposes:
o dust suppression
o approved landfill "flushing"
o other (see guidance)
Yes
Not subject to prohibition
No
Placement is landfill not subject to prohibition
Yes
Treatment allows material to pass Paint Filter Liquids Test
No
Material is a liquid or contains free liquids (fails Paint Filter Liquids Test)
Placement is prohibited unless owner/operator is granted exemption
Owner/operator examines alternatives
Discharge to POTW or through NPDES permit, or other form of treatment, is reasonably available
Yes
Exemption to 3004(j)(3) will not be granted
No
Placement in alternative lined Subtitle C or D impoundment is reasonably available
Yes
Exemption to 3004(j)(3) will not be granted
No

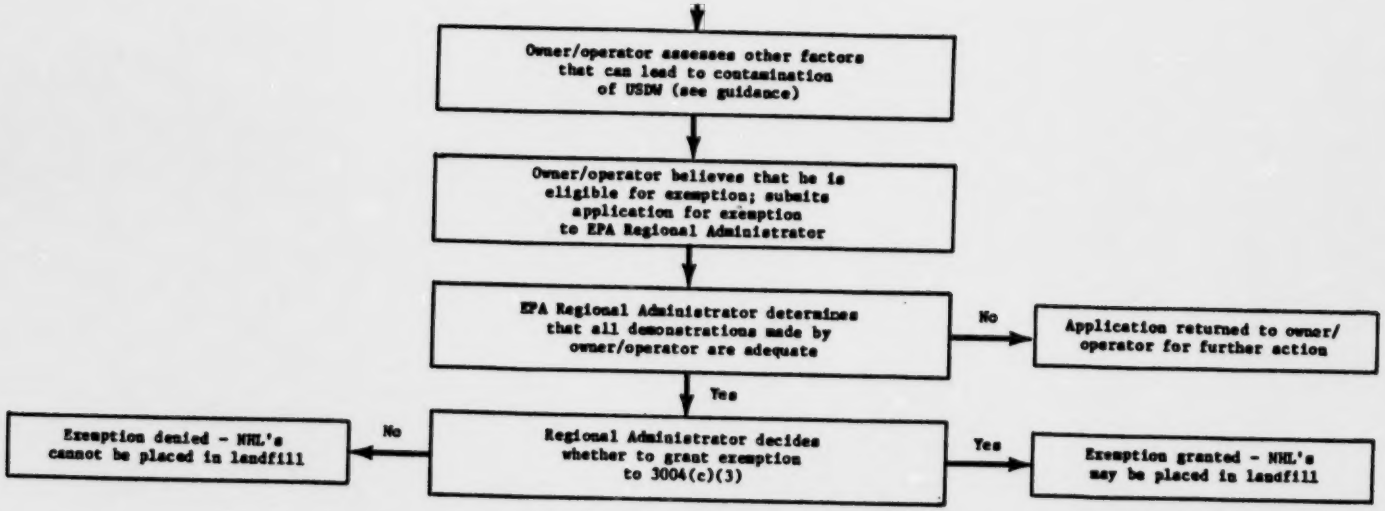
(continued)

EXHIBIT 1 (continued)


Placement in alternative unlined Subtitle D impoundment that does not contain hazardous wastes is reasonably available
Yes
Exemption to 3004(j)(3) will not be granted
No
Placement in Subtitle D landfill that does not contain hazardous wastes is reasonably available
Yes
Exemption to 3004(j)(3) will not be granted
No
Owner/operator concludes that only reasonably available alternative is placement in landfill or unlined impoundment that may contain hazardous wastes
Owner/operator assesses risk of contamination to USDW if NHL's are placed in Subtitle C landfill
Ground water monitoring data represent samples from USDW
No
Yes
Owner/operator shows that GWPS or ACL set under 40 CFR 264.92 or 270.14(c)(7-8) will not be exceeded in any USDW (use fate and transport model)
GWPS or ACL set under 40 CFR 264.92 or 270.14(c)(7-8) is exceeded
No
Yes
Yes
No
Exemption to 3004(c)(3) will not be granted
Exemption to 3004(c)(3) will not be granted

(continued)

EXHIBIT 1 (continued)


Owner/operator assesses other factors that can lead to contamination of USDW (see guidance)
Owner/operator believes that he is eligible for exemption; submits application for exemption to EPA Regional Administrator
EPA Regional Administrator determines that all demonstrations made by owner/operator are adequate
No
Application returned to owner/ operator for further action
Yes
Regional Administrator decides whether to grant exemption to 3004(c)(3)
No
Exemption denied - NHL's cannot be placed in landfill
Yes
Exemption granted - NHL's may be placed in landfill

*This flowchart summarizes the guidance, and should not be used without it.

to the Regional Administrator, or the Regional Administrator determines, that:

(1) The only reasonably available alternative to the placement in such landfill is placement in a landfill or unlined surface impoundment, whether or not permitted or operating under interim status, which contains, or may reasonably be anticipated to contain, hazardous waste; and

(2) Placement in such owner or operator's landfill will not present a risk of contamination of any underground source of drinking water (as that term is defined in section 144.3 of this chapter).

2. Statutory and Regulatory Requirements

A. Purpose

The Section 3004(c)(3) provision and related provisions that restrict the placement of bulk and containerized liquid hazardous wastes in landfills (Sections 3004(c)(1) and (2) of RCRA) are intended to reduce the placement of liquids in hazardous waste landfills and thus to reduce the probability of migration of hazardous wastes into ground water. The provisions will also reduce the quantity of leachate that must be collected and treated at these landfills.

B. What constitutes placement of nonhazardous liquids?

Congress used the word "placement" in several places in the Hazardous and Solid Waste Amendments, including the section that addresses bulk liquid hazardous wastes. The Agency's interpretation of "placement" of nonhazardous liquids is, accordingly, similar to that adopted for bulk liquid hazardous wastes (see Prohibition on the Placement of Bulk Liquid Hazardous Waste in Landfills, Statutory Interpretative Guidance - Draft, March, 1985

and Final, expected in June, 1986).

The Agency interprets the restriction on "placement" of NHL's to include, but not be limited to, the following: 1) placing nonhazardous liquids still in liquid form into any part of a landfill cell prior to solidification, and 2) placing NHL's into any part of an active landfill unit where the liquids are then solidified, whether or not subsequent transfer to another part of the active landfill unit may occur. The legislative history of a related statutory provision, Section 3004(b) (banning the placement of liquid hazardous wastes in salt domes, underground mines, or caves), supports the view that Congress intended the ban on "placement" to be construed broadly in order to prohibit the storage of material that is awaiting further treatment or disposal, and to preclude the use of such locations as treatment chambers (129 Cong. Rec. H8141, daily ed. October 6, 1983). Thus, EPA considers that the restriction on nonhazardous liquids applies regardless of the purpose of placing the liquids into a landfill, except as described below.

Uses of NHL's that are necessary to meet other regulatory or safety requirements, including EPA-approved corrective actions, are not considered to be subject to the restrictions under 3004(c)(3). The Agency believes that Congress did not intend to require owners or operators to apply for an exemption for uses of nonhazardous liquids in or near a landfill that are necessary to comply with the technical requirements of the RCRA regulations. Based on the language and legislative history of Section 3004(c)(3) and

of Section 3004(c) generally, EPA believes that Congress' primary concern in banning liquids was the control of the placement of liquids in landfills for treatment, storage, or disposal. The presence of the provision in 3004(c)(3)(A), which was intended to prevent shifting of the nonhazardous liquids to other locations, confirms that Congress intended this provision to address waste management methods. For this reason, uses such as the following should not be subject to the restrictions under 3004(c)(3): dust suppression, fire fighting, intermittent watering of vegetative cover, moistening of a clay cap to prevent cracking or offgassing, washing of landfill equipment, and herbicide or pesticide treatment to control certain organisms that could breach a cap or liner. In addition, EPA believes that the use of liquids for approved corrective action purposes (e.g., landfill washing or soil flushing to reduce hazardous waste concentrations) does not require an owner or operator to apply for an exemption under 3004(c)(3). Such uses are clearly outside the scope of the provision. It would not be appropriate to require the identification of "reasonably available alternatives" under 3004(c)(3)(A) in these cases because the liquid is being used to meet corrective action requirements at the landfill. Section 3004(c)(3)(B) also appears to be largely inapplicable, inasmuch as ground water (though not necessarily an underground source of drinking water) will already be contaminated in these cases, and EPA will already have made the determination that corrective action is necessary to remove or treat contamination.

A liquid is considered to be nonhazardous if its composition

or its physical or chemical properties would not, if it were a waste, qualify it as a hazardous waste under 40 CFR Part 261. It should be noted that an NHL need not be a "waste" for the restrictions under 3004(c)(3) to apply. When addressing bulk liquid hazardous wastes and other classes of materials, the statute refers to them as "wastes"; there is no such reference in 3004(c)(3). Therefore, EPA interprets the restriction in Section 3004(c)(3) as applying to all nonhazardous liquids, not only to liquid wastes.

To comply with the restriction, the owner or operator must determine if a nonhazardous material, whether containerized or in bulk form, is a liquid or contains free liquids. EPA regulations define "free liquids" as "liquids which readily separate from the solid portion of a waste under ambient temperature and pressure" (40 CFR 260.10). ("Liquids" and "free liquids" include liquids that separate out during transportation to the landfill.) If it is not obviously clear to the owner or operator that a nonhazardous material contains free liquids, the material must be tested. The Agency considers the Paint Filter Liquids Test (Method 9095; 50 FR 18370 (April 30, 1985)) appropriate for this purpose; this is the same test that should be used for bulk liquid hazardous waste. (The legislative history states that "the definition of liquids is the same for liquid hazardous and nonhazardous waste" (129 Cong. Rec. H8139, daily ed., October 6, 1983); thus the use of the same test as for bulk hazardous wastes is clearly appropriate.) The test defines the substance being tested as a liquid if, within

a 5-minute period, any fluid passes through the paint filter from a representative sample of the substance.

If a sample passes the Paint Filter Liquids Test (i.e., no fluid passes through the filter within 5 minutes), the nonhazardous material is not subject to the restriction in Section 3004(c)(3) and can be placed in a hazardous waste landfill. If a sample fails the Paint Filter Liquids Test, it must be determined if treatment is a reasonably available alternative. If it is, the material may be treated (but not in the landfill unit itself) so that it passes the test, at which time it is no longer subject to 3004(c)(3) and thus may be placed in a hazardous waste landfill. Congress specifically prohibited the use of absorbents in treating bulk liquid hazardous wastes but made no mention of absorbents in addressing NHL's. Had such an absolute prohibition been intended for NHL's, EPA believes that Congress would have included it. Therefore, nonhazardous liquids to which absorbents have been added may be placed in a hazardous waste landfill, so long as a representative sample of the absorbed material passes the Paint Filter Liquids Test. However, EPA encourages the use of structurally stable, nonbiodegradable absorbents if NHL's are treated with absorbents.

C. What is required to qualify for an exemption to Section 3004(c)(3)?

The second question that must be addressed is whether there is any reasonably available alternative to the placement of the NHL in the Subtitle C landfill. The owner or operator of a hazardous waste landfill who seeks to place nonhazardous liquids

in liquid form in that landfill must make the demonstrations required by HSWA and the implementing regulations. These demonstrations are described in this and succeeding sections of this guidance; the manner in which the demonstrations must be made and the information that is required to make the demonstrations are described in Section 3.

To qualify for an exemption, the owner or operator of a Subtitle C landfill must show that all available alternatives have been examined and must demonstrate that the only reasonably available alternative is placement in another Subtitle C landfill or any other landfill or unlined impoundment (whether or not regulated under 40 CFR Part 264-265) that is known to contain or may reasonably be anticipated to contain hazardous wastes. Factors such as technological considerations, engineering considerations, the relative locations of suitable alternative sites, the nature of the nonhazardous liquid, applicable State restrictions on universe of hazardous waste, the commercial availability of alternative facilities, as well as other factors all may be used to determine reasonable availability. Potential alternatives to the Subtitle C landfill that should be considered are discussed below in Sections 2.D, 3.C, and 3.D of this guidance.

D. What alternatives to placement in a Subtitle C landfill should be considered?

There are several alternatives to placing the NHL in a Subtitle C landfill that should be considered by the owner or operator. If any alternative is found to be reasonably available, the owner or operator is not eligible for the exemption under

3004(c)(3) and thus may not place the NHL in the Subtitle C landfill while the material remains in liquid form or contains free liquids.

Among the potential alternatives that should be considered are alternatives that do not involve storage or disposal in any landfill or impoundment. These alternatives may include injection wells; destruction (e.g., by incineration or reuse as fuel); discharge to a publicly owned treatment works (POTW); discharge through an NPDES permit; or treatment (e.g., physical, chemical, or biological). Appendix A lists several publications that may be useful in selecting an appropriate alternative. Treatment that would allow the NHL to pass the Paint Filter Liquids Test, and thus no longer be subject to 3004(c)(3), also should be considered. It should be noted that if the nonhazardous liquids are treated in any way, the treatment may not occur within the Subtitle C landfill unit.

Other alternatives that should be considered include placement in other impoundments or landfills. Lined impoundments regulated under Subtitle D (that do not contain hazardous waste) or Subtitle C of RCRA, unlined Subtitle D impoundments that do not contain hazardous wastes, and Subtitle D landfills (whether lined or unlined) that do not contain hazardous wastes are all potential alternatives. Owners or operators of Subtitle C landfills must demonstrate that none of these various alternative facilities are reasonably available in order to qualify for an exemption to 3004(c)(3).

In determining whether an impoundment is lined or unlined, the intent of Congress is clear. The legislative history states that "the term 'unlined' means a unit which does not meet the requirements of 40 CFR Part 264, Subpart K, promulgated on July 26, 1982" (129 Cong. Rec. H8141, daily ed., October 6, 1983). The July 1982 regulations at 40 CFR 264.221 require, in effect, a clay or synthetic liner to be installed for storage surface impoundments, and a synthetic liner to be installed at disposal impoundments. The clay liner must be of sufficient thickness to prevent waste migration beyond its base during the active life (including the closure period) of the impoundment. Therefore, EPA considers an impoundment to be unlined if:

- it has no liner;
- it is a disposal unit and has no synthetic liner (see Draft Minimum Technological Guidance on Single Liner Systems for Landfills, Surface Impoundments, and Waste Piles-Design, Construction, and Operation, May 1985. EPA/530-SW-85-013);
- it is a storage unit and has an inadequate clay liner; or
- it, for any reason, has an inadequate liner, regardless of the materials used.

Several or many alternative landfills and impoundments may have to be considered by an owner or operator who is seeking an exemption (Sections 3.C and 3.D list the specific alternative facilities that must be considered). It must be demonstrated that each alternative landfill and unlined impoundment contains, or may reasonably be anticipated to contain, hazardous wastes. Owners or operators could determine the likelihood that alternative landfills or unlined impoundments contain or might contain hazardous

wastes (including small quantity generated wastes) in several ways (the legislative history refers to units that "contain or might contain hazardous wastes due to prior disposal practices" (129 Cong. Rec. H8138, daily ed., October 6, 1983).

An examination of each alternative facility's records may provide evidence that hazardous wastes might be present. However, these records may refer to previously disposed wastes by names other than chemical names (e.g., product names or other commonly used names), so some care would be necessary in comparing the records to materials listed in 40 CFR Part 261. Records at alternative sites may also identify industries that utilized the site for disposal in the past; a list of industries and their associated hazardous wastes is included as Appendix C of EPA's guidance on RCRA Preliminary Assessment/Site Investigation to Implement Corrective Action. This list could be valuable in assessing the likelihood of prior disposal of hazardous wastes. (The list is included as Appendix B.) It should be noted that the examination of records at potential alternative facilities may not be useful in identifying wastes that are classified as hazardous only because they exhibit certain characteristics defined in Subpart C of 40 CFR Part 261 (ignitability, corrosivity, reactivity, and EP Toxicity). In addition, the quality of records that predate the interim status rules (November 19, 1980) at alternative facilities must be taken into account before the determination that no hazardous wastes are present can be made.

The most obvious means of determining whether an alternative landfill or unlined impoundment contains or might contain hazardous

wastes is by sampling the contents of the alternative unit. The examination of such databases as CERCLIS, compiled under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, or Superfund), may be used to assess the potential presence of hazardous wastes. In heavily industrialized areas, commercial facilities are likely to have received hazardous wastes in the past and this may be considered in making the determination if alternative facilities contain hazardous waste. Current or recent disposal of certain hazardous wastes by small quantity generators (SQG's) may be identified as a result of an HSWA requirement (Section 3001(d) of RCRA) that certain SQG wastes be manifested.

E. What constitutes a risk of contamination to an underground source of drinking water?

As stated in the Final Codification Rule, an underground source of drinking water (USDW) is defined in 40 CFR 144.3. That section defines a USDW as:

> ... an aquifer or its portion:
>
> (a)(1) Which supplies any public water system; or
>
> (2) Which contains a sufficient quantity of ground water to supply a public water system; and
>
> (i) Currently supplies drinking water for human consumption; or
>
> (ii) Contains fewer than 10,000 mg/L total dissolved solids; and
>
> (b) Which is not an exempted aquifer.

It should be noted that as used in these regulations, "aquifer"

refers to an entire hydrogeologic unit, not only the point(s) at which water is or could be withdrawn. "Public water system" is defined at 40 CFR 142.2(k) as "a system for provision to the public of piped water for human consumption, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year." Per capital water use varies greatly depending on geographical and seasonal consumption, so the water volume necessary to qualify an aquifer as a potential public water system could be relatively small in some circumstances.

To qualify as a USDW, an aquifer need not be actively supplying public water. Under 40 CFR 144.3, as noted above, the aquifer need only have sufficient capacity to supply a public water system, have less than 10,000 milligrams per liter (mg/L) total dissolved solids, and not be an exempted aquifer (exemption criteria are provided at 40 CFR 146.4). To illustrate the restrictiveness of the 10,000 mg/L dissolved solids limitation, ground water having a total dissolved solids concentration greater than 500 mg/L is not recommended for human consumption and any ground water having more than 2,000 mg/L is generally unfit for long-term irrigation (Clark, J.W. et al. Water Supply and Pollution Control. Harper and Row Publishers, New York, 1977.)

The most complete sources of information concerning identified USDW's are the State regulatory offices with jurisdiction over underground injection wells. State offices that deal with drinking water may also be valuable sources of information. Appendix C contains a list of EPA and State officials who may be helpful in

identifying USDW's.

The owner or operator of a Subtitle C landfill must also demonstrate that placing the nonhazardous liquids in the landfill would pose no risk to a USDW. EPA believes that a risk of contamination to a USDW exists when there is a threat to human health and the environment resulting from an increase in the concentration of hazardous wastes or constituents. The ground water protection standards (including alternate concentration limits) set under §264.92 and .94 are set at a level that protects human health and the environment. EPA presumes that if the constitutent concentrations in ground water are already at an unacceptable level, the addition of liquids to the unit that is leaking will increase the risks posed by that unit. A landfill would be ineligible for the exemption under 3004(c)(3) if 1) any concentration of a hazardous waste or constituent in a USDW exceeds any ground-water protection standard (unless it is shown that the landfill is not responsible for the contamination or that the addition of NHL's would not increase the risk) or 2) if the addition of nonhazardous liquids to a landfill could cause concentrations to exceed any ground water protection standard (including alternate concentration limits).

3. General Guidance

A. Introduction

As discussed in preceding sections of this guidance, an owner or operator of a hazardous waste landfill who seeks to place nonhazardous liquids in the landfill must demonstrate that the

only reasonably available alternative is placement in a landfill or an unlined impoundment (whether or not regulated under Subtitle C of RCRA) that contains or may contain hazardous wastes. The owner or operator must also demonstrate that placement of the nonhazardous liquid in his hazardous waste landfill would not pose a risk of contamination to any underground source of drinking water. Section 3.B below specifies the manner in which owners or operators may apply for an exemption to Section 3004(c)(3) of RCRA, and Section 3.C specifies the information that must be provided by owners or operators to make the required demonstrations. Section 3.D lists the alternatives to such placement that should be considered and found not to be reasonably available.

B. How may an owner or operator apply for an exemption to Section 3004(c)(3)?

An owner or operator who seeks to place nonhazardous liquids in a hazardous waste landfill must make the demonstrations described in Sections 2.D, 2.E, and 3.C of this guidance to the EPA Administrator. A prospective owner or operator who is applying for a permit under 40 CFR Part 270 for a hazardous waste landfill should make the demonstrations in the initial Part B permit application. An owner or operator of a hazardous waste landfill that is currently operating under a final permit must make the demonstrations in an application for a major permit modification. EPA notes that all owners or operators of currently operating hazardous waste landfills were required to submit a Part B application for a final permit by November 8, 1985. Because the information needed in assessing an exemption request includes data already available in

a complete Part B, owners or operators still operating under interim status should amend their applications with the additional information described in this guidance. EPA will make all efforts to process the exemption requests concurrent with the Part B permit application. However, owners or operators are entitled to have their exemption request acted upon prior to final action on their Part B permit application. Consequently, procedures for such action during the interim status period are included in this guidance.

C. What information, in addition to information already in the Part B, must be submitted to make the required demonstrations?

The owner or operator seeking an exemption from Section 3004(c)(3) of RCRA must first identify the nonhazardous liquid that is to be placed in the Subtitle C landfill. The nature of the nonhazardous liquid and the volume to be received must be specified.

The owner or operator must then make the demonstrations regarding alternatives by identifying the specific alternatives that were considered, by describing the alternatives that were found not to be reasonably available, and by providing appropriate documentation for those findings. First, the owner or operator must show that alternatives other than placement in any landfill or impoundment were considered; these alternatives should include, at a minimum, those that are described in Section 2.D of this guidance and listed in Section 3.D. The owner or operator should describe the reason or reasons why each of these alternatives was found not to be reasonably available and provide appropriate

documentation. Technological and engineering considerations, the nature of the nonhazardous liquid, applicable State restrictions and other factors may all be considered in assessing the reasonable availability of these alternatives.

The owner or operator must also show that alternative surface impoundments and landfills were considered and identify the facilities considered. At a minimum, the facilities of the following types nearest the generator should be considered: Subtitle D (nonhazardous waste) impoundments; Subtitle D landfills; and Subtitle C (hazardous waste) impoundments. (The owner or operator of the Subtitle C landfill who is seeking an exemption may require the generators of the NHL's to provide information on alternative facilities. It should be noted, however, that the landfill owner or operator is responsible for making the demonstrations.) The reason or reasons why each alternative facility has been found not to be reasonably available must also be provided. The criteria described in the previous paragraph may be used for justification here as well; the relative locations of alternative facilities and their commercial availability may also be used. (It should be noted that the possible presence of hazardous wastes in an alternative facility does not affect reasonable availability. The language of 3004(c)(3) refers to the presence or possible presence of hazardous wastes in landfills and unlined impoundments as the only acceptable reason for rejecting a reasonably available alternative, not as a means of determining reasonable availability.)

If any alternative surface impoundment is found to be reasonably available, the owner or operator who is seeking an exemption must

provide evidence that it is unlined and that it contains or may contain hazardous wastes. (It should be noted that nonhazardous wastes placed in lined Subtitle C or D impoundments (i.e., those that meet the requirements for liners in 40 CFR Part 264, Subpart K in effect on July 26, 1982 and July 15, 1985) are not subject to the restrictions of Section 3004(c)(3).) If any alternative landfill is determined to be reasonably available, the owner or operator must show that it contains or may contain hazardous wastes. Evidence to justify the showing must also be provided for Subtitle D landfills (Subtitle C landfills may be assumed to contain hazardous wastes).

The owner or operator must also show that there is no risk of contamination to a USDW (as defined in Section 2.E of this guidance). Permit writers will use ground water monitoring data to determine if contamination has occurred, and will consider other information submitted by the owner/operator in assessing whether the addition of nonhazardous liquids would result in contamination.

If a facility has received a permit, the ground water monitoring data submitted according to the standards in 40 CFR Part 264 Subpart F should provide the permit writer adequate information to determine the extent of contamination (if any) that has occurred at or beyond the point of compliance. If an interim status facility has not (yet) received a permit, it will have submitted a Part B permit application. This application would include a summary of Part 265 monitoring data under 40 CFR 270.14(c)(1) and a description of aquifers beneath the facility

under (c)(2). In addition, 270.14(c)(4) requires certain interim status facilities to describe in their Part B applications any plume of contamination that has entered the ground water from the landfill, and to identify the concentration of each Appendix VIII constituent. Facilities that should have complied with (c)(4) are those that should have a Part 265 monitoring system but do not (e.g., those that wrongly claimed a monitoring waiver); those whose interim status data indicate contamination has occurred; and those whose Part 265 monitoring system is or was inadequate to determine whether a plume of contamination has occurred. The data submitted under 270.14(c) should be of adequate quantity and quality to qualify the facility for a permit. If adequate to qualify for a permit, the information should allow the permit writer to determine the extent of contamination (if any) that has occurred.

If the ground water monitoring data represent samples taken from a USDW, the process followed by the permit writer will be relatively straightforward. If the ground water protection standard (including an alternate concentration limit, if applicable) set under 40 CFR 264.92, or for interim status facilities any concentration limit proposed by the owner or operator, and tentatively accepted by the permit writer under 40 CFR 270.14(c)(7)-(8), has not been exceeded in the USDW, the facility may qualify for an exemption to 3004(c)(3). Similarly, if groundwater monitoring data (under Part 264 Subpart F or under 270.14(c)) do not represent samples taken from a USDW but show that no ground water protection standard has been exceeded, the facility may be eligible. In

those cases, concentrations in the nearest USDW, even if it is hydraulically connected to the uppermost aquifer (where monitoring occurs), would not likely exceed the limits.

In cases where the concentration of any hazardous waste or constituent exceed a ground water protection standard, but the monitoring data do not represent samples taken from a USDW, or where there are no ground water monitoring data available (because the facility was exempt from Part 265 Subpart F requirements and has either received or applied for an exemption from Part 264 Subpart F requirements), additional information will be necessary. In order to be considered for an exemption under 3004(c)(3) in these cases, the owner or operator should show either that the landfill is not responsible for any contamination that has been detected or that concentrations in the USDW itself will not exceed levels that are protective of human health and the environment. EPA believes that in most cases the appropriate levels would be equivalent to those established for the ground water protection standard. The following information should be submitted in making these showings:

- design and operating characteristics of the landfill (including the presence of a double liner and leachate collection system meeting the requirements of 3004(o) guidance (see Draft Minimum Technological Guidance on Double Liner Systems for Landfills and Surface Impoundments - Design, Construction, and Operation - May 1985 (EPA 530-SW/ 85-014);

- geology and hydrogeology of the area surrounding the landfill (including any hydraulic connections between the ground water in which monitoring occurs and any USDW);

- anticipated fate and transport of the contaminant(s) in ground water between the point of compliance and any USDW.

(In cases where an interim status facility has applied for a waiver of Part 264 Subpart F requirements in the Part B application, the facility would be eligible for the NHL exemption if the permit writer concludes that the facility would qualify for the waiver. A finding that a facility meets 264.90(b)(4) is sufficient to grant the NHL exemption, but if the facility fails to meet (b)(4) it could still submit the additional information because (b)(4) is a "no migration standard", which is more stringent than the ground water protection standard.) EPA presumes that if the ground water protection standard has been exceeded, there is a risk from the addition of nonhazardous liquids, which could leach additional constituents or increase the rate of migration. However, it is possible, even in a case where the ground water protection standard has been exceeded, that an owner or operator may have information to show that the addition of NHL's would not increase the risk or would even reduce the risk. Permit writers will consider any such information submitted by the owner or operator.

If a ground water protection standard has not been exceeded, the owner or operator should also demonstrate whether the addition of nonhazardous liquids is likely to create a situation that may lead to an exceedance of a ground water protection standard in the future. Principal factors that should be addressed are (1) information on the compatibility of the NHL and the liner(s) present and (2) compatibility of the NHL with the existing wastes, including the likelihood for mobilization of hazardous constituents by the NHL. Other information that would be useful in making such an assessment include, but is not limited to, operating data (e.g., a history of receiving liquids), information concerning the

design and installation of liner(s) and leachate collection systems, and information concerning the location of the nearest USDW and the intervening hydrogeology. The potential for a time lag between the release of a hazardous constituent and its arrival in the USDW, due to the hydrogeologic characteristics of intervening geologic materials, will be considered.

D. Alternatives that should be considered

The owner or operator applying for an exemption to Section 3004(c)(3) should have considered the following alternatives. To qualify for the exemption, each alternative considered must be shown not to be reasonably available.

1. Alternatives that preclude placement in any landfill or impoundment:

   a. Destruction (e.g., incineration and reuse as fuel)
   b. Discharge to a publicly owned treatment works
   c. Discharge through an NPDES permit
   d. Placement in an injection well
   e. Treatment (e.g., physical, chemical, or biological)

2. Alternative impoundments and landfills:

   a. Lined Subtitle C impoundments that may contain hazardous wastes
   b. Subtitle D impoundments (lined or unlined) that do not contain hazardous wastes
   c. Subtitle D landfills (lined or unlined) that do not contain hazardous wastes

E. Implementation

The owner or operator applying for an exemption to Section 3004(c)(3) must send an application to the EPA Regional Administrator. Upon receipt of an exemption request, EPA will perform a review to determine administrative and technical completeness. The review will normally be completed at the same time the Part B

is evaluated (for interim status facilities) and will be based on the information requirements outlined in Section 3.C. The permit writer will evaluate this information using all available data, including data submitted as part of a Part B application. If the application is incomplete, EPA will request the missing information through a Notice of Deficiency letter (NOD). The letter will detail the information necessary to complete the application and specify a date for submission of the data. This date will normally be thirty days from receipt of the NOD.

When all the necessary information has been received, EPA will notify the applicant in writing that the application is complete. Normally, review of a complete application by EPA will not take more than one year. For interim status facilities, EPA will issue its decision on the exemption request as part of the final permit decision. If the owner or operator wishes the actions to be placed on different schedules, he should express this in the exemption request.

The owner/operator of a currently operating landfill will have submitted a Part B permit application by 11/8/85. In those instances where an owner/operator of an interim status facility is seeking an exemption before the time when the facility's Part B permit application is going to be acted upon by EPA, public notice procedures under 40 CFR Part 124 should be followed.

For those facilities operating under a final permit and submitting the application through a major permit modification, 40 CFR Part 124 public participation and appeal procedures would

also apply.

A prospective owner or operator applying for a permit under 40 CFR Part 270 should make demonstrations in the initial Part B application in order to have this information considered during permitting. In this case all public participation and processing requirements would be the same as for the permit itself.

Approval or denial of the exemption requests may take place through two mechanisms: (1) issuance of the final RCRA permit or permit modification or (2) after appropriate public notice outlined above, through written notice from the EPA Regional Administrator. An application may be denied for the following reasons: (1) a facility cannot meet the exemption standards outlined in 3004(c)(3); (2) adequate information to make such a determination was not received; (3) the applicant misrepresented relevant facts in his application. (Administrative review under 40 CFR 124.19 is not available for interim status facilities.)

EPA recommends that approval of any exemption to 3004(c)(3) require that information regarding the nature of the NHL's and disposal practices be part of the facility's operating record, under §§264.73 or 265.73.

If an owner or operator has already received an exemption from Section 3004(c)(3) by making the required demonstrations, new exemptions may be necessary if the owner or operator wishes to increase the volume of the nonhazardous liquids addressed in the previous exemption or if the owner or operator wishes to place liquids of a different nature from those already allowed by the previous exemption. New exemptions would be necessary to the

extent that changes in the volume or nature of the nonhazardous liquids affect the reasonable availability of alternatives and the risk of contamination of any underground source of drinking water. (It should be noted that many of the demonstrations submitted in the application for the previous exemption would also satisfy the requirements of subsequent applications.)

APPENDIX A

PUBLICATIONS FOR USE IN DETERMINING REASONABLE AVAILABILITY OF ALTERNATIVES

U.S. Environmental Protection Agency, Office of Solid Waste. 1986 (February). Preliminary Assessment/Site Investigation Guidance. (Available from USEPA, Office of Solid Waste, 401 M Street SW, Washington, DC 20460)

U.S. Environmental Protection Agency. 1982 (June). Guide to the Disposal of Chemically Stabilized and Solidified Waste. U.S. Government Printing Office (Washington, DC), stock number 055-000-00226. $6.00.

U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. 1982 (June). Handbook for Remedial Action at Waste Disposal Sites. EPA-625/6-82-006 P882-239054. National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. $37.00.

U.S. Environmental Protection Agency, Office of Water Guidance Documents. 1980 (June). NPDES Best Management Practices Manual. PB80-135221. National Technical Information Service 5285 Port Royal Road, Springfield, VA 22161. $17.00.

APPENDIX B

INDUSTRIES AND THEIR ASSOCIATED HAZARDOUS WASTES

INDUSTRIES AND THEIR RELATED HAZARDOUS WASTES

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
01	AGRICULTURAL PRODUCTION-CROPS	Spent defoliant and weed killer.	U240	Acid	2-4 Dichlorophenoxyacetic 2,4-D
		Primarily used as a systematic insecticide.	P085	Amide	Octamethylpyrophosphoramide Schradan
		By-products from the manufacture of insecticides such as DDT.	U034	Aldehyde	Chloral Trichloroacelaldehyde
		Primary use is in the manufacture of insecticides, tanning agents, and rubber.	U053	Aldehyde	Crotonaldehyde 2-butenal
		By-products from the manufacture of agricultural chemicals, rocket fuels, and metal plating solutions.	U133	Amine	Hydrazine Diamine
		Used in the manufacture of medicine, plated metal, and insecticides. Spent chemical reagent.	P121	Nitrogen Compound	Zinc cyanide
		Primarly used as a herbicide on a variety of vegetation.		Sulfur Compound	Aramite 2-(p-t-butylphenyloxy)isapropy
		Primarily found in insecticides and acaricide (for mites and ticks).	P039	Sulfur Compound	Disulfton O,O-diethyl S-[2-(ethyl-thio)]
		Primarily used as an insecticide.	P050	Sulfur Compound	Endosulfan
		Possible by-products from the manufacture of insecticides, disinfectants, bacteriostat, and rubber.	U244	Sulfur Compound	Thiuram Tetramethylthiuram disulfide
		By-products from the manufacture of arsenates, insecticides, and dyes.	P011	Oxygen Compound	Arsenic pentoxide Arsenic (V) oxide
		Used in the manufacture of pigments, ceramic enamels, insecticides, rodenticide, and herbicide.	P012	Oxygen Compound	Arsenic trioxide Arsenic (III) oxide

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
01	AGRICULTURAL PRODUCTION-CROPS	By-products from the manufacture of various insecticides or fumigants.	P006	Organometallic Compd.	Aluminum phosphide ALP
		Spent solvent. Spent degreaser. Spent organic laboratory reagent. By-product in manufacture of various insecticides and photographic films.	U209 K019 K020 K030 K073 K095	Hydrocarbon	1,1,2,2-tetrachloroethane Acetylene tetrachloride
		By-products from the manufacture of various pesticides and insecticides.	U084 F024	Hydrocarbon	1-3 dichloropropene
		Used as a fumigant and disinfestant of various domestic crops.	U029	Hydrocarbon	Bromomethane Methyl bromide
		Primary uses include pesticide for controlling leaf rollers and other insects.	U060	Hydrocarbon	DDD Dichlorodiphenyldichloro-
		Primarily used as an insecticide for cotton and tobacco crops.	U061	Hydrocarbon	DDT Dichlorodiphenyltrichloro-
		Primarily found in insecticides.	P059 K097	Hydrocarbon	Heptachor
		Primarily used in the manufacture of insecticides.	U129	Hydrocarbon	Hexachlorocyclohexane HCCH
		Primarily found in contact insecticides.	P062	Hydrocarbon	Hexaethyl tetra phosphate HETP
		Primary usage is as a soil fumigant for nematodes.	U066	Hydrocarbon	L,2-dibromo-3-chloropropane
		By-products from the manufacture of insecticides, pharmaceuticals, disinfectants, solvents, rubber, and gasolines.	U101 K001	Aromatic Hydrocarbon	2,4 dimethyl phenol Xylenol
		Primarly used as a herbicide.		Aromatic Hydrocarbon	2-sec-Butyl-4,6-dinitriphenol Dinoseb

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
01	AGRICULTURAL PRODUCTION-CROPS	By-products from the manufacture of or spent insecticides.	P004	Aromatic Hydrocarbon	Aldrin (HHDN)
		Used in the manufacture of nitro cellulose lacquers and elastomers, insecticides, inks, adhesives, and solid rocket propellent.	U069	Aromatic Hydrocarbon	Di-n-butyl phthalate DBP
		Primarily used in the production of insecticides.	P037	Aromatic Hydrocarbon	Dieldrin HEOD
		Primarily used as an insecticide.	P051	Aromatic Hydrocarbon	Endrin
		Spent organic solvent, by-product from the manufacture of various dyes, insecticides, and metal polishes.	U070 F002 F024 K042 K085 K105	Aromatic Hydrocarbon	L,2-dichlorobenzene O-dichlorobenzene
		By-products from the manufacture of insecticides.	U071 F024 K085 K105	Aromatic Hydrocarbon	L,3-dichlorobenzene m-dichlorobenzene
		Primarily used as an insecticide, especially for cotton.	P071	Aromatic Hydrocarbon	Methyl parathion
		Primarily used in manufacture of insecticides and acaricide.	P089	Aromatic Hydrocarbon	Pentachloronitrobenzene PCNB
0131	COTTON	Primarily used as an insecticide for cotton and tobacco.	U061	Hydrocarbon	DDT Dichlorodiphenyltrichloro-
		Used as an insecticide for cotton and vegetables in the early stages of growth.	P123 K098 K041	Hydrocarbon	Toxaphene Octachloro camphene
0132	TOBACCO	Primarily used as a herbacide with application to tobacco and sugar beets.	U148	Nitrogen Compound	Maleic hydrazide 1,2-dihydro-3,6-pyri-dazinedio

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
0132	TOBACCO	Primarily used as an insecticide for cotton and tobacco crops.	U061	Hydrocarbon	DDT Dichlorodiphenyltrichloro-
07	AGRICULTURAL SERVCS.	Spent defoliant and weed killer.	U240	Acid	2-4 Dichlorophenoxyacetic 2,4-D
		Used in the manufacture of various arsenates, and glass. Used as a wood preservative and vegetation defoliant.	P010	Acid	Arsenic acid Orthoarsenic acid
33 39		Primarily used as a systematic insecticide.	P085	Amide	Octamethylpyrophosphoramide Schradan
		By-products from the manufacture and waste treatment of various pharmaceuticals, herbicides, and polymers, especially polyurethane and polyester resins.	P003	Aldehyde	Acrolein Acrylic aldehyde
		By-products from the manufacture of insecticides such as DDT.	U034	Aldehyde	Chloral Trichloroacelaldehyde
		Primary use is in the manufacture of insecticides, tanning agens, and rubber.	U053	Aldehyde	Crotonaldehyde 2-butenal
		Spent laboratory reagents. By-product from manufacture of fertilizers, dyes, embalming fluids, disinfectants, and germicides.	U122 K009 K010 K038 K040	Aldehyde	Formaldehyde Methylene oxide
		Primarily used as soil fumigant, chemical intermediate, laboratory reagent and solvent.	P102	Alcohol	2-propyn-1-ol Propargyl alcohol
		By-products from the manufacture and treatment of pharmaceuticals, herbicides, plasticizers, and glycerol.	P005	Alcohol	Allyl alcohols 2-propen-1-ol
		Possible by-products from the manufacture of dyes, and agricultural chemicals.	U167	Amine	1-naphthylamine

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
07	AGRICULTURAL SERVCS.	Possible by-products from the manufacture of dyes, and agricultural chemicals.	U168	Amine	2-naphtylamine
		By-products from the manufacture of agricultural chemicals, rocket fuels, and metal plating solutions.	U133	Amine	Hydrazine Diamine
		By-products from the manufacture of pharmaceuticals, dyes, and agricultural chemicals.	P024	Amine	P-Chloroaniline Benzenamine
		Used in the manufacture of various rodenticide, fumigants, and as a leaching agent for gold and silver ore.	P021	Nitrogen Compound	Calcium cyanide
		Spent herbicide.	U062	Nitrogen Compound	Diallate 2,3-dichloroallyl diisopro-
		Used in the production of pharmaceuticals (including veterinary), pesticides, and fungicides.	U238	Nitrogen Compound	Ethyl carbamate Urethane
		Primarily used as a herbacide with application to tobacco and sugar beets.	U148	Nitrogen Compound	Maleic hydrazide 1,2-dihydro-3,6-pyri-dazinedio
		Manufacturing by-products and treatment of viscone rayon, cellophane, and veterinary medicines.	P022 F005	Sulfur Compound	Carbon disulfide Carbon bisulfide
		Primarily found in insecticides and acaricide (for mites and ticks).	P039	Sulfur Compound	Disulfton O,O-diethyl S-[2-(ethyl-thio)]
		Primarily used as an insecticide.	P050	Sulfur Compound	Endosulfan
		Used in the manufacture of medicine, rodenticide, pesticide, and as an analytical reagent.	P115	Sulfur Compound	Thallium sulfate Thallous sulfate
		By-products from the manufacture of arsenates, insecticides and dyes.	P011	Oxygen Compound	Arsenic pentoxide Arsenic (V) oxide

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INDUSTRIES AND THEIR RELATED HAZARDOUS WASTES

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
07	AGRICULTURAL SERVCS.	Used in the manufacture of pigments, ceramic enamels, insecticides, rodenticides, and herbicides.	P012	Oxygen Compound	Arsenic trioxide Arsenic (III) oxide
		By-products from the manufacture of various insecticides or fumigants.	P006	Organometallic Compd.	Aluminum phosphide ALP
		Spent solvent. Spent degreaser, spent organic laboratory reagent. By-product in the manufacture of various insecticides and photographic films.	U209 K019 K020 K030 K073 K095	Hydrocarbon	1,1,2,2-tetrachloroethane Acetylene tetrachloride
		By-products from the manufacture of various pesticides.	U084 F024	Hydrocarbon	1-3 dichloropropene
		Used as a fumigant and disinfestant of various domestic crops. hydrocarbon.	U029	Hydrocarbon	Bromomethane Methyl bromide
		By-products of the manufacture of various insecticides.	U036 K097	Hydrocarbon	Chlordane
		Various spent refrigerants and propellants. By-products from the manufacture of insecticides and fluorocarbon plastics. Spent analytical laboratory reagents.	U044 K009 K010 K019 K020 K021 K029 K073	Hydrocarbon	Chloroform Trichloromethane
		Primary uses include pesticide for controlling leaf rollers and other insects.	U060	Hydrocarbon	DDD Dichlorodiphenyldichloro-
		Primarily used as an insecticide for cotton and tobacco crops.	U061	Hydrocarbon	DDT Dichlorodiphenyltrichloro-
		Primarily used in the manufacture of insecticides.	U129	Hydrocarbon	Hexachlorocyclohexane HCCH

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INDUSTRIES AND THEIR RELATED HAZARDOUS WASTES

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
07	AGRICULTURAL SERVCS.	Primary usage is as a soil fumigants for nematodes.	U066	Hydrocarbon	1,2-dibromo-3-chloropropane
		By-products from the manufacture of insecticides.	U071 F024 K085 K105	Aromatic Hydrocarbon	1,3-dichlorobenzene m-dichlorobenzene
		Primarily used as an insecticide and rodenticide.	P111	Hydrocarbon	Tetraethyl pyrophosphate TEPP
		Primarily used as an insecticide.	P109	Hydrocarbon	Tetraethyldithio pyrophosphate TEDP
		Used as an insecticide (cotton and vegetables in early stages of growth).	P123 K098 K041	Hydrocarbon	Toxaphene Octachloro camphene
		By-products from the manufacture of insecticides, pharmaceuticals, disinfectants, solvents, rubber, and gasolines.	U101 K001	Aromatic Hydrocarbon	2,4 dimethyl phenol Xylenol
		Primarily used as a plant hormone, herbicide, defoliant.	U232	Aromatic Hydrocarbon	2,4,5-trichlorophenoxyacetic
		Used as a fungicide, herbicide, and defoliant.	U231 K043 K001 K099 K105	Aromatic Hydrocarbon	2,4,6 trichlorophenol
		By-products from the manufacture of or spent insecticides.	P004	Aromatic Hydrocarbon	Aldrin (HHDN)
		Possible distillation by-products of phenol, chloronitro benzene, and aniline. Spent pesticide intermediates.	U037 F001 F002 F024 K015 K016	Aromatic Hydrocarbon	Chlorobenzene Phenyl chloride

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
07	AGRICULTURAL SERVCS.	By-products from the manufacture of disinfectants, surfactants, salicylaldhydes, coumarin, and various herbicides.	U052 F004	Aromatic Hydrocarbon	Cresols Methyl phenol
		Used in the manufacture of nitro cellulose lacquers and elastomers, insecticides, inks, adhesives, and solid rocket propellent.	U069	Aromatic Hydrocarbon	Di-n-butyl phthalate DBP
		Primarily used in the production of insecticides. Chemi	P037	Aromatic Hydrocarbon	Dieldrin HEOD
		Primarily used as an insecticide.	P051	Aromatic Compound	Endrin
		Spent organic solvent, by-product from the manufacture of various dyes, insecticides, and metal polishes.	U070 F002 F024 K042 K085 K105	Aromatic Hydrocarbon	L,2-dichlorobenzene. O-dichlorobenzene
		Primarily used as an insecticide (especially cotton).	P071	Aromatic Hydrocarbon	Methyl parathion
		Primarily used in manufacture of insecticides and acaricide.	P089	Aromatic Hydrocarbon	Pentachloronitrobenzene PCNB
		Primarily used in the medicine and veterinary medicine.	U187	Aromatic Hydrocarbon	Phenacatin N-(4-ethoxyphenyl)-acetamide
		Primarily used as a medicine (anti-hypertension) and in animal feed.	U200	Aromatic Hydrocarbon	Reserpine
10	METAL MINING	Used in the manufacture of various rodenticide, fumigants, and as a leaching agent for gold and silver ore.	P021	Nitrogen Compound	Calcium cyanide
		Primarily used in detonation caps.	P065	Nitrogen Compound	Mercury fulminate Mercuric cyanate

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
10	METAL MINING	Used in insecticides, fumigants, gold and silver ore processing. Spent analytical chemistry reagent.	P098	Nitrogen Compound	Potassium cyanide
		Possible by-products from the manufacture of gold and silver processing, electroplating, hydrocyanic acid, insecticides, dyes, pigments, and chelating agents.	P106	Nitrogen Compound	Sodium cyanide
		Used in the manufacture of medicine and processing of various ores.	U214	Organometallic Comp.	Thallium acetate Thallous acetate
		Primarily used as an organic intermediate, for geological assaying and as a solvent for waxes, greases, and oils.	U225	Hydrocarbon	Tribromomethane Bromoform
12	BITUMINOUS COAL & LIGNITE MINING	Found in coal tar and is a by-product of incomplete combustion.	U022 K035	Aromatic Hydrocarbon	Benzo(a) pyrene 3-4-Benzopyrene
22	TEXTILE MILL PRODUCTS	Used as a yellow dye in paper, various textiles, and leathers. It is also a fungicide.	U014	Amine	Auramine Benzenamine
		By-products from the manufacture of agricultural chemicals, rocket fuels, and metal plating solutions.	U133	Amine	Hydrazine Diamine
		Used in the manufacture of dyes, textiles, glass, photographic developer and as a catalyist in many organic reactions.	P119	Oxygen Compound	Vanadic Acid Vanadium pentoxide
		Possible by-products from the manufacture of sulfric acid, glas, photographic developer, and dyed textiles.	P120	Oxygen Compound	Vanadium pentoxide Vanadium (v) oxide
		By-products from the manufacture of polyester and alkyl resins, pesticides, and paper.	U147 K023 K093	Anhydride	Maleic anhydride 2,5-Furanedione
		Possible by-products from the manufacture of medicines, textiles, pigments, varishes. Spent analytical laboratory reagent.	U144	Organometallic Comp.	Lead acetate Acetic acid (lead salt)

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INDUSTRIES AND THEIR RELATED HAZARDOUS WASTES

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
22	TEXTILE MILL PRODUCTS	Primarily used as a preservative in gums, glues, inks, paints, textiles, and leater goods.	U039 K001	Hydrocarbon	P-chloro-m-cresal 4-chloro-3-methyl phenol
		Primarily used in the manufacture of flame-retardent textile products.	U235	Hydrocarbon	Tris (2,3-dibromopropyl) phosp Tris
24	LUMBER & WOOD PRODUCTS	Used in the manufacture of various arsenates, and glass. Used as a wood preservative and vegetation defoliant.	P010	Acid	Arsenic acid, Orthoarsenic acid
		Primary uses include wood preservatives and disinfectants.	U051 K035 K001	Aromatic Compound	Creosote
		Possible by-products from the manufacture of fungicide, bacteria, algicide, herbicide, and wood preservatives.	U242 K001	Aromatic Hydrocarbon	Pentachlorophenol
26	Paper & Allied Products	Possible by-products from the manufacture of fungicides, bactericides, pulp and paper, electrical apparatus, pants, and pharmaceutical.	K071 K106	Cationic Compound	Mercury Quicksilver
		Possible by-product from the manufacture of paper, textiles, leather, fumigants, insecticides, medicines, mining, vinyl resins, and electroplating.	U123	Acid	Formic Acid Methanoic Acid
		Possible by products from the manufacture of dyes, adhesives, paper and textiles.	U007 K014	Amide	Acrylamide
		Used as a yellow dye in paper, various textiles, and leathers. It is also a fungicide.	U014	Amine	Auramine Benzenamine
		See nitrosamine for description.		Nitrogen Compound	N-Nitrosomorpholine
		See nitrosamine for description.		Nitrogen Compound	N-Nitrosononicotine

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
26	Paper and Allied Products	Possible by-products in the manufacture of medicinal, agricultural, textile, rubber, and plastic chemicals.		Nitrogen Compound	Nitrosamine
		Possible by-products in the manufacture of medicinal, agricultural, textile, rubber, and plastic chemicals.		Nitrogen Compound	Nitrosonornicotine
		Primarily used in the manufacture of pyrotechnics, ceramics, glass and paper.	P107	Sulfur Compound	Strontium sulfide
		By-products from the manufacture of polyester and alkyl resins, pesticides, and paper.	U147 K023 K093	Anhydride	Maleic anhydride 2,5-Furanedione
		Primarily used in electroplating, paper production and production of various resins.	U155	Hydrocarbon Hydrocarbon	Methapyrilane
28	Chemicals and Allied Products	Possible by-product from the manufacture of photographic chemicals, electrical equipment, jewelry, medicines, and various alloys.		Cationic Compound	Silver
		Primarily used as an alloy additive, in various glasses, pesticides, and various photoelectric applications.		Cationic Compound	Thallium
		Possible by-products from the manufacture of paper, textiles, leather, fumigants, insecticides, medicines, mining, vinyl resins, and electroplating.	U123	Acid	Formic Acid Methanoic Acid
		See nitrosamine for description.		Nitrogen Compound	N-Nitrosomorpholine
		See nitrosamine for description.		Nitrogen Compound	N-Nitrosononicotine
		Possible by-products in the manufacture of medicinal, agricultural, textile, rubber, and plastic chemicals.		Nitrogen Compound	Nitrosamine

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
28	Chemicals and Allied Products	Possible by-products in the manufacture of medicinal, agricultural, textile, rubber, and plastic chemicals.		Nitrogen Compound	Nitrosonornicotine
		Primarily used as a dye intermediate, corrosion inhibitor and medicinals for poultry.	P077	Nitrogen Compound	P-Nitroaniline Para-Nitraniline
		Used in the manufacture of dyes, textiles, glass, photographic developer and as a catalyist in many organic reactions.	P119	Oxygen Compound	Vanadic Acid Vanadium pentoxide
		Possible by products from the manufacture of various resins, polyester, dyes, pharmaceutical, insecticides and laboratory reagents.	U190 K093 K094	Anhydride	Phthalic Anhydride
		Possible by-products from the manufacture of laquers, paints, detergents, cements, cosmetics, and fumigants.	U108	Hydrocarbon	1,4 - Dioxane Diethylene Ether
		Possible spent organic laboratory reagent.		Hydrocarbon	Cycasin/(Methyl-O,N,N-Azoxy)Methyl B-D
		Possible by-products from the manufacture of dyes, resings, pesticides, fungicides, and pharmaceuticals.	U130 K032 F024 K033 K034	Hydrocarbon Hexachloroc	Hexachlorocyclopentadiene Perchlorocyclapentodiene
281	INDUSTRIAL INORGANIC CHEMICALS	Used in the production of medicines and as a industrial catalyst.	U216	Anionic Compound	Thallium chloride Thallous chloride
			P114	Anionic Compound	Thallium selenite
		Primarly used along or as an additive to light weight, high strenght alloys and as an additive to solid propellant rocket fuel.	P015	Cationic Compound	Berylluim
		Used as an alloy additive, in storage batteries, in various pigments, in fungicides, and in various photographic chemicals.	F006 K069 K061 K100	Cationic Compound	Cadium

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
281	INDUSTRIAL INORGANIC CHEMICALS	Used in medicines and as a rat poison.	P122	Cationic Compound	Zinc phosphide
		Primarily used as a chemical reagent.	U204	Acid	Selenious acid Selenium dioxide
		Used in various electroplating solutions.	P013	Nitrogen Compound	Barium Cyanide
		Used in the manufacture of various rodenticides, fumigants, and as a leaching agent for gold and silver ore.	P021	Nitrogen Compound	Calcium cyanide
		By-products from electroplating copper and inorganic synthesis involving cyanide ion.	P029	Nitrogen Compound	Copper cyanide Cupric cyanide
		Primary uses include fumigants, parasiticides, and rat exterminants.	U246	Nitrogen Compound	Cyanogen bromide Bromine cyanide
		Primarily used in detonation caps.	P065	Nitrogen Compound	Mercury fulminate Mercuric cyanate
		Spent chemical intermediate.	P076	Nitrogen Compound	Nitric oxide Nitrogen monoxide
		By-products from the manufacture of nitric acid.	P078	Nitrogen Compound	Nitrogen dioxide
		Primarily used in dye production, gasoline, medicines, and corrosion inhibitors.	P077 K083 F004 K103 K104	Nitrogen Compound	P-nitro benzene 4-nitro-benzamine
		Used in insecticides, fumigants, gold and silver ore processing. Spent analytical chemistry reagent.	P098	Nitrogen Compound	Potassium cyanide
			P099	Nitrogen Compound	Potassium silver cyanide

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
281	INDUSTRIAL INORGANIC CHEMICALS	Possible by-products from the manufacture of gold and silver processing, electroplating, hydrocyanic acid, insecticides, dyes, pigments, and chelating agents.	P106	Nitrogen Compound	Sodium cyanide
		Primarily used as an analytical reagent and in the production of pyrotechnic chemicals.	U217	Nitrogen Compound	Thallium nitrate Thallous nitrate
		Manufacture by-products and treatment of viscone rayon, cellophane, and veterinary medicines.	P022 F005	Sulfur Compound	Carbon disulfide Carbon bisulfide
		Primarily used in medicines (treatment of seborrhea).	U205	Sulfur Compound	Selenium sulfide Sulfur selenide
		Primarily used in the manufacture of pyrotechnics, ceramics, glass and paper.	P107	Sulfur Compound	Strontium sulfide
		Used in the manufacture of medicine, rodenticide, pesticide, and as an analytical reagent.	P115	Sulfur Compound	Thallium sulfate Thallous sulfate
		By-products from the manufacture of arsenates, insecticides, and dyes.	P011	Oxygen Compound	ARSENIC PENTOXIDE ARSENIC (V) OXIDE
		By-products from the manufacture of arsenates, insecticides, and dyes.	P011	Oxygen Compound	Arsenic pentoxide Arsenic (V) oxide
		Used in the manufacture of pigments, ceramic enamels, insecticides, rodenticides, and herbicides.	P012	Oxygen Compound	Arsenic trioxide Arsenic (III) oxide
		By-products from the manufacture of pigments, corrosion inhibitors, and coating for light weight metals.	U032	Oxygen Compound	Calcium chromate
			P113	Oxygen Compound	Thallic oxide Thallium III oxide
		Possible by-products from the manufacture of sulfric acid, glass, photographic developer, and dyed textiles.	P120	Oxygen Compound	Vanadium pentoxide Vanadium (V) oxide

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INDUSTRIES AND THEIR RELATED HAZARDOUS WASTES

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
2816	Inorganic Pigments	Primarily used as an alloy additive to metals to add corrosion and high temperature resistance and in the manufacture of inorganic pigment.	K100 K061 K005 K048 K062 K069	Cationic Compound	Chromium
		Primarily used as an alloy additive to metals to add corrosion and high temperature resistance and in the manufacture of inorganic pigment.	K002 K006 K049 K003 K007 K050 K004 K008 K051	Cationic Compound	Chromium
282	PLASTICS,SYNTHETICS, FIBERS;EXCEPT GLASS	Used in the production of various elastomers, coating and plastics, such as styrene and butadiene.	U152	Nitrile	Methacrylonitrile MAN
		Used in the leather tanning, and in manufacturing adhesives and polyester.	U126	Aldehyde	Glycidylaldehyde
		Possible by-products from the manufacture of medicines (sedative), oils, waxes, rubber, solvents, leather.	U182 K009 K010 K026	Aldehyde	Paraldehyde 2,4,6 trimethyl1-1,3,5-trioxan
		Possible by-products from the manufacture of pharmaceuticals, dyes, rubber, polyester resins, and fungicide.	U166 K024	Ketone	1,4-Naphthoquinone 1,4-naphthalenedione
		By-products from the manufacture of fiberglass, acrylic resins, and reinforced plastics.	U160	Ketone	2-Butanone peroxide Methyl ethyl keton peroxide
		Primarily used as a curing agent for polyurethanes and epoxy resins.	U158	Amine	4-4-methylene bis (2-chloro-an
		By-products from the manufacture of rubber and certain dyes such as microscopy stains.	U021	Amine	Benzidine (l,l-biphenyl)-4,4 diamine

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
282	Plastic Materials & Synthetics	Used as an agent to allow heat stabilization of cellulose nitrate.	K104 K083	Amine	Diphemylamine
		Used in insecticides, fumigants, gold and silver ore processing. Spent analytical chemistry reagent.	U191 K026	Nitrogen Compound	2-picoline 2-methyl-pyridine
		By-products of the manufacturing in the following industries: pharmaceuticals, ion exchange and protective coatings, adhesives, and surfactants.	P054	Nitrogen Compound	Ethylene imine Aziridene
		Possible by-products from the manufacture of synthetic resins, pharmaceuticals, insecticides, and fungicides.	U116	Nitrogen Compound	Ethylene thiourea 2-imidazolidinethione
		Possible by-products from the manufacture of drugs, resins, photographic chemicals, and as an analytical reagent.	U219	Nitrogen Compound	Thiourea Thiocarbamide
		Primarily used in the production of polyurethane foams, elastomers, and coating.	U223 K027	Nitrogen Compound	Tolylene diisocyanate 1,3-diisocyanatomethyl
		Used in the manufacture of various fungicides and rubber.	P049	Sulfur Compound	2, 4 - Dithiobiuret Biuret
		Manufacturing by-products and treatment of viscone rayon, cellophane, and veterinary medicines.	P022 F005	Sulfur Compound	Carbon disulfide Carbon bisulfide
		Possible by-products from the manufacture of insecticides, fungicides, disinfectants, bacteriostat, and rubber.	U244	Sulfur Compound	Thiuram Tetramethylthiuram disulfide
		By-products of the manufacture of various epoxy and phenoxy resins.	U041	Oxygen Compound	Epichlorohydrin 1-chloro-2,3-epoxy propane
		Primarily used as a monomer for polymethacrylate resins.	U162	Oxygen Compound	Methyl methacryrlate

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
282	PLASTICS,SYNTHETICS, FIBERS;EXCEPT GLASS	By-products from the manufacture of polyester and alkyl resins, pesticides, and paper.	U147 K023 K093	Anhydride	Maleic anhydride 2,5-Furanedione
		Primarly used in the production o polysulfide rubber and as a solvent.	U024	Hydrocarbon	BIS (2-Chlorethoxy) Methane Dichloroethyl Formal
		By-products from the manufacture of poly sulfide rubber. Spent solvent.	U024 K017	Hydrocarbon	Bis(2-chloro ethoxy) methane Dichloroethyl formal
		Spent ion-exchange resins and laboratory reagents.	P016 K017	Hydrocarbon	Bis(chloroethyl) ether Dichlorodimethyl ether
		Various spent refrigerants and propellants. By-products from the manufacture of insecticides and fluorocarbon plastics. Spent analytical laboratory reagents.	U044 K009 K010 K019 K020 K021 K029 K073	Hydrocarbon	Chloroform Trichloromethane
		Primarily used in the production of various strong-base, ion exchange (anion) resins.	U046	Hydrocarbon	Chloromethyl Methyl Ether CMME
		Possible by-products from the manufacture of pharmaceuticals, resins, dyes, and pesticides.	U130 F024 K032 K033 K034	Hydrocarbon	Hexachlorocyclopentadiene
		Primarily used in electroplating, paper production and the production of various resins.	U155	Hydrocarbon	Methapyrilane
		Primarily used in the manufacture of alkyd resin known for fast drying speeds.	U162	Hydrocarbon	Methyl Methocrylate
		By-product from the manufacture of polyvinyl chloride and related polymers.	U043 K019 K029 K020 K028	Hydrocarbon	Vinyl chloride Chloroethylene

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
282	Plastic Materials & Synthetics	Primarly used as plasticizer in the production of such polymers as polyvinyl chloride.	U028	Aromatic Hydrocarbon	BIS (2-Ethylhexyl) Phthalate Diactyl Phthalate
		Used in the manufacture of various polyvinyl and cellulosic resins and as an organic intermediate.		Aromatic Hydrocarbon	Butyl Benzyl Phthalate BBP
		Used in the manufacture of nitro cellulose lacquers and elastomers, insecticides, inks, adhesives, and solid rocket propellent.	U069	Aromatic Hydrocarbon	Di-n-butyl phthalate DBP
		Primarily used as a monomeric plasticizer for vinyl and cellulosic resins.	U107	Aromatic Hydrocarbon	Di-n-octyl phthalate
		Possible by-products from the manufacture of insecticides, plastics camphor substitute, solid rocke propellent and solvent for mitrocellulose and cellulose acetate.	U088	Aromatic Hydrocarbon	Diethy Phthalate Ethyl Phthalate
		By-products from the manufacture of cellulose acetate, resins, perfumes, plastics, rubbers, and solid rocket propellants.	U102	Aromatic Compound	Methyl phthalate
		Possible by-products from the manufacture of various resins, dyes, pharmaceuticals, adhesives, medicines, and rubber.	U201	Aromatic Hydrocarbon	Resorcinol Resorcin
		Spent solvent. Fuel additive. By-products from manufacture of resins, coatings, dyes, and explosives.	U220 K015 F005 K036 F024 K037	Aromatic Compound	Toluene Methyl benzene
283	DRUGS	Used in the production of medicines and as a industrial catalyst.	U216	Anionic Compound	Thallium chloride Thallous chloride
		Possible by-products from the manufacture of fungicides, bactericides, pulp and paper, electrical apparatus, pants, and pharmaceutical.	K071 K106	Cationic Compound	Mercury Quicksilver

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INDUSTRIES AND THEIR RELATED HAZARDOUS WASTES

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
283	DRUGS	Used in medicines and as a rat poison.	P122	Cationic Compound	Zinc phosphide
		Used in the manufacture of various medicine.	U035	Acid	Chlorambacil Butanoic acid
		Primarily used in the production of various medicines and insect chemosterilant.	U150	Acid	Melphalan Surcclysin
		By-products from the manufacture of dyes and pharmaceuticals.	U006	Acid Halide	Acetyl chloride Ethanoyl chloride
		By-products from the manufacture and waste treatment of photographic chemicals, quarternay (ammonium) agents, perfumes, agents, perfumes, and pharmaceuticals.	P028 U157 K015 K085	Acid Halide	Benyl chloride 3,4-benzacridine
		By-products from the manufacture and waste treatment of various pharmaceuticals, herbicides, and polymers, especially polyurethane and polyester resins.	P003	Aldehyde	Acrolein Acrylic aldehyde
		Possible by-products from the manufacture of medicines (sedative), oils, waxes, rubber, solvents, leather.	U182 K009 K010 K026	Aldehyde	Paraldehyde 2,4,6 trimethyl1-1,3,5-trioxan
		Possible by-products from the manufacture of pharmaceuticals, dyes, rubber, polyester resins, and fungicide.	U166 K024	Ketone	1,4-Naphthoquinone 1,4-naphthalenedione
		By-products from the manufacture and treatment of pharmaceuticals, herbicides, plasticizers, and glycerol.	P005	Alcohol	Allyl alcohols 2-propen-1-ol
		Used in the manufacture of various medicines.	P046	Amine	Alpha-alpha-dimethyl phenethyl
		By-products from the manufacture of pharmaceuticals, dyes, and agricultural chemicals.	P024	Amine	P-Chloroaniline Benzenamine

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
283	DRUGS	Used in insecticides, fumigants, gold and silver ore processing. Spent analytical chemistry reagent.	U191 K026	Nitrogen Compound	2-picoline 2-methyl-pyridine
		Possible by-products from the manufacture of pharmaceuticals as well as pesticides and disinfectants.		Nitrogen Compound	4-Hydroxylaminoquinoline N-Oxi
		By-products from the manufacture of medicines and lubricant additives.	P018	Nitrogen Compound	Brucine Dimethoxystrychnine
		Used in the production of pharmaceuticals including veterinary), pesticides, and fungicides.	U238	Nitrogen Compound	Ethyl carbamate Urethane
		By-products of the manufacturing in the following industries: pharmaceuticals, ion exchange and protective coatings, adhesives, and surfactants.	P054	Nitrogen Compound	Ethylene imine Aziridene
		Possible by-products from the manufacture of synthetic resins, pharmaceuticals, insecticides, and fungicides.	U116	Nitrogen Compound	Ethylene thiourea 2-imidazolidinethione
		Possible by-product from the manufacture of medicines, insecticides, and leather tanning.	P075	Nitrogen Compound	Nicotine and salts
		Used as medicine in the chemical treatment of cancer.		Nitrogen Compound	Nitrogen Mustard
		Primarily used as a medicine.		Nitrogen Compound	Propylthiouracil 6-prepyl-2-thiouracil
		Spent solvent. By-product from the manufacture of various vitamins, drugs, dyes, fungicides.	U196 K026 F005	Nitrogen Compound	Pyridine
		Primarily used as a non-nutritive sweetner found in syrups, medicines, soft drinks, and dietic foods.	U202	Nitrogen Compound	Saccharin O-benzosulfimide

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
283	DRUGS	Possible by-products from the manufacture of drugs, dyes, resins, photographic chemicals, and as an analytical reagent.	U219	Nitrogen Compound	Thiourea Thiocarbamide
		Used in the manufacture of medicine, plated metal, and insecticides. Spent chemical reagent.	P121	Nitrogen Compound	Zinc cyanide
		Used in the manufacture of various pharmaceutical products.	P014	Sulfur Compound	Benzenethiol Thiophenol
		Primarily used in medicines (treatment of seborrhea).	U205	Sulfur Compound	Selenium sulfide Sulfur selenide
		Used in the manufacture of medicine, rodenticide, pesticide, and as an analytical reagent.	P115	Sulfur Compound	Thallium sulfate Thallous sulfate
		A soluble, largely monianic complex used to treat iron-deficiency anemias in humans and livestock.	U139	Organometallic Comp.	Iron dextran
		Possible by-products from the manufacture of medicines, textiles, pigments, varishes. Spent analytical laboratory reagent.	U144	Organometallic Comp.	Lead acetate Acetic acid (lead salt)
		Used in the manufacture of medicine and processing of various ores.	U214	Organometallic Comp.	Thallium acetate Thallous acetate
		Possible by products from the manufacture of varnishes, adhesives, insecticides, pharmaceuticals, allylalcohol and a precursor of epechlorohydrin.	F024	Hydrocarbon	3-Chloropropene Allyl Chloride
		Possible by-products from the manufacture of pharmaceuticals, resins, dyes, and pesticides.	U130 F024 K032 K033 K034	Hydrocarbon	Hexachlorocyclopentadiene
		Utilized in cancer research as an antineoplastic agent.		Hydrocarbon	Tris(1-azidyl) Phosphine Sulfi

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
283	Drugs	Primarily used as an insecticide, germicide, dye and pharmaceutical intermeidate and as a fumigant.	U072 F024	Aromatic Hydrocarbon	1,4-Dichlorobenzene PDB
		By-products from the manufacture of insecticides, pharmaceuticals, disinfectants, solvents, rubber, and gasolines.	U101 K001	Aromatic Hydrocarbon	2,4 dimethyl phenol Xylenol
		Possible by-product from the manufacture of various dyes and pharmaceuticals.	P047	Aromatic Hydrocarbon	4-6 dinitro-o/cresol DNCP
		Used in the manufacture of medicines, herbicides and as a catalyst in various polymeriyation processes.	P036	Aromatic Hydrocarbon	Dichlorophenylarsine
		Spent organic laboratory reagent. By-product from the manufacture of various dyes, pharmaceuticals, and phenol-based compounds. Spent solvent.	U188 K021 K001 K087	Aromatic Hydrocarbon	Phenol Carbolic acid
		Possible by-products from the manufacture of dyes, medicines, perfumes, and various organic laboratory reagents.	U190	Aromatic Hydrocarbon	Phthalic acid esters
		Primarily used as a medicine (anti-hypertension) and in animal feed.	U200	Aromatic Hydrocarbon	Reserpine
		Possible by-products from the manufacture of various resins, dyes, pharmaceuticals, adhesives, medicines, and rubber.	U201	Aromatic Hydrocarbon	Resorcinol Resorcin
		Primarily used in the manufacture of perfumes, soaps, medicines, insecticides, and heliotropin.	U203	Aromatic Hydrocarbon	Safrole 4-allyl-1,2-methylene dioxyben
2834	Pharmaceutical Preparations	Primarily used as antitumer agent drug.	U058	Nitrogen Compound	Cychlophosphamide
		An antibiotivc derived from a single amino acid source.	U015	Hydrocarbon	Azaserine

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
2834	Pharmaceutical Preparations	Primarily used in the manufacture of contraceptive drugs.	U089	Hydrocarbon	Diethylstilbestrol
		Used as an anticancer drug.	U059	Aromatic Hydrocarbon	Daunomycin
284	SOAP, DETERGENTS AND OTHER CLEANING PREP.	By-products from the manufacture of cellulose acetate, resins, perfumes, plastics, rubbers, and solid rocket propellants.	U102	Aromatic Hydrocarbon	Methyl phthalate
		By-products from the manufacture and waste treatment of photographic chemicals, quarternay (ammonium) agents, perfumes, dyes, and pharmaceuticals.	P028 K015 K085	Acid Halide	Benzyl chloride 1-chlorotoluene
		By-products from the manufacture of various perfumes and flavorings. Spent intermediate for various pharmaceuticals.	U004	Ketone	Acetophenone 1-phenyl ethanone
		Possible by-products from the manufacture of pharmaceutical products as well as pesticides and disingectants.		Nitrogen Compound	4-Hydroxylaminoquinoline N-oxi
		By-products of the manufacture for the following industries: pharmaceuticals, ion exchange and protective coatings, adhesives, and surfactants.	P054	Nitrogen Compound	Ethylene imine Aziridene
		Possible by-products from the manufacture of gold and silver processing, electroplating, hydrocyanic acid, insecticides, dyes, pigments, and chelating agents.	P106	Nitrogen Compound	Sodium cyanide
		By-products from the manufacture of several glycols, surfactants and rocket propellant.	U115	Oxygen Compound	Ethylene oxide 1,2-epoxy ethane
		Spent organic solvent. By-product from manufacture of vinyl chloride, soaps, chelating agents, degreasers, and anti-knock gasoline.	U077 F024 K018 K029 K096	Hydrocarbon	1,2-dichloroethane Ethylene dichloride

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
284	SOAP, DETERGENTS AND OTHER CLEANING PREP.	Spent organic solvent. By-product from the manufacture of perfumes, lacquers, and thermoplastics.	U079	Hydrocarbon	1,2-dichloroethylene Acetylene chloride
		Spent organic solvents. By-product from the manufacture of perfumes, lacquers, and thermoplastics.	U078 K073 F024	Hydrocarbon	1,1-dichloroethylene Vinylidene chloride
		By-products from the manufacture of disinfectants, surfactant, salicylaldhydes, coumarin, and various herbicides.	U052 F004	Aromatic Hydrocarbon	Cresols Methyl phenol
		Possible by-products from the manufacture of dyes, medicines, perfumes, and various organic laboratory reagents.	U190	Aromatic Hydrocarbon	Phthalic acid esters
		Primarily used in the manufacture of perfumes, soaps, medicines, insecticides, and heliotropin.	U203	Aromatic Hydrocarbon	Safrole 4-allyl-1,2-methylene dioxyben
285	Paints and Allied Products	Possible by-products from the manufacture of fungicides, bactericides, pulp and paper, electrical apparatus, pants, and pharmaceuticals.	K071 K106	Cationic Compound	Mercury Quicksilver
		Possible by products from the manufacture of dyes, adhesives, paper and textiles.	U007 K014	Amide	Acrylamide
		Spent non-halogenated solvents; spent cleaning or spinning solvent; spent paint, laquor, or varnish remover.	U002	Ketone	Acetone 2-propanone
		Spent organic laboratory reagent. Spent paint solvent.	U140 F005	Alcohol	Isobutyl alcohol Isobutanol
		Possible by products from the manufacture of rubber, dyes, photographic chemicals, explosives, herbicides, fungicides and petroleum refining.	U012 K083 K103 K104	Amine	Aniline Phenylamine
		Primarily found in the production of various dyes.		Nitrogen Compound	4-Amino Biphenyl

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INDUSTRIES AND THEIR RELATED HAZARDOUS WASTES

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
285	PAINTS, VARNISHES, LAQUERS & ENAMELS	Used in the manufacture of pigments, ceramic enamels, insecticides, rodenticide, and herbicide.	P012	Oxygen Compound	Arsenic trioxide Arsenic (III) oxide
		Used in the organic synthesis of various dyes.	U048 K001	Hydrocarbon	2-Chlorophenol 2-chloro-1-hydroxybenzene
		Used in the manufacture of paints, varnishes, lacquers.	U025 K017	Hydrocarbon	Bis(2-chloroethyl) ether Dichloroethyl ether
		Primarily used as a dye.		Aromatic Hydrocarbon	Citrus Red #2 L-[2,5 Dimethoxyphenyl-azo]-2-
		Spent organic solvents. By-product from the manufacture of perfumes, lacquers, and thermoplastics.	U078 K073 F024	Hydrocarbon	L,l-dichloroethylene Vinylidene chloride
		Spent solvent. Spent degreaser. Spent paint remover.	U080 F001 K009 F002 K010 F024	Hydrocarbon	Methylene chloride Dichloromethane
		Primarily used as a preservative in gums, glues, inks, paints, textiles, and leather goods.	U039 K001	Hydrocarbon	P-chloro-m-cresal 4-chloro-3-methyl phenol
		Used in the manufacture of nitro cellulose lacquers and elastomers, insecticides, inks, adhesives, and solid rocket propellent.	U069	Aromatic Hydrocarbon	Di-n-butyl phthalate DBP
286	Industrial Organic Chemicals	Used in the manufacture of various fungicides and rubber.	P049	Sulfur Compound	2, 4 - Dithiobiuret Biuret
		Used in synthesis of methionine, as a jet fuel additive, and as a fungicides.	U153	Sulfur Compound	Methanethial Methyl Mercaptan
		Used as an implement of war primarily during World War I.		Sulfur Compound	Mustard Gas Bis (2-chloroethyl) sulfide

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
286	Industrial Organic Chemicals	Primarily used as a solvent, dielectric fluid heat-transfer medium, and in dyes and insecticide production.	F024	Hydrocarbon	1,2,4 Trichlorobenzene
		Extensively used as a chemical intermediate and in the production of various glycol ethers.	U041	Hydrocarbon	1-Chloro-2-3-epoxypropane Epichlorohydrin
		Isomer of 2,4-Dichlorphend See that listing.	U082 K043	Hydrocarbon	2,6-Dichlorophenol
		Primarily used in the manufacture of neoprene.	F024	Hydrocarbon	2-Chloro-1,3-butadine Chloroprene
		Possible by products from the manufacture of varnishes, adhesives, insecticides, pharmaceuticals, allylalcohol and a precursor of epechlorhydrin.	F024	Hydrocarbon	3-Chloropropene Allyl Chloride
		Intermediate for various industrial organic synthesis reactions.	U027	Hydrocarbon	BIS (2-Chloroisopropyl) Ether
		Primarly used in the manufacture of polysulfide rubber and as a solvent.	U024	Hydrocarbon	BIS (2-Chloroithoxy) Methane Dichloroethyl Formal
		Primarily used in the production of various strong-base,ion exchange (anion) resins.	U046	Hydrocarbon	Chloromethyl Methyl Ether CMME
		Used as a metal degreciser and solvent.	U187 F024	Hydrocarbon	Pentachloroethane Pentalin
		Product of the organic synthesis of Thionophosphoric acid and various olefins.		Hydrocarbon	Triethyl Phosphonothioate
		Primarily used as an insecticide, germicide, dye and pharmaceutical intermediate and as a soil fumigant.	U072 F024	Aromatic Hydrocarbon	1,4-Dichlorobenzene PDB
		Used in various organic synthesis reactions.	U081 K043	Aromatic Hydrocarbon	2,4-Dichlorphenol

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
286	Industrial Organic Chemicals	Used in the organic synthesis of various dyes.	U048 K001	Aromatic Hydrocarbon	2-Chlorophenol 2-Chloro-1-hydroxybenzene
		Primarily used as an insecticide on citrus crops.		Aromatic Hydrocarbon	2-Cyclohexyl-4,6-Dinitrophenol
		Primarily used in the manufacture of various dyes and as a curing agent for urethane resins.	U095	Aromatic Hydrocarbon	3,3-Dimethyl Benyidine o-tolidine
		Primarily used as a plasticizer in the production of such polymers as polyvinyl chloride.	U028	Aromatic Hydrocarbon	BIS (2-Ethylhexyl) Phthalate Diactyl Phthalate
		Used in the manufacture of various polyvinyl and cellulosic resins and as an organic intermediate.		Aromatic Hydrocarbon	Butyl Benzyl Phthalate BBP
		Primarly used as a plasticizer and solvent in rubber production, as a heat transfer medium and in various waxes.	U047	Aromatic Hydrocarbon	Chloronophtlalene Chlorinated Naphthalene
		Used in the manufacture of medicines, herbicides and as a catalyst in various polymeriyation processes.	P036	Aromatic Hydrocarbon	Dichlorophenylarsine
		Possible by-products from the manufacture of incesticides, plastics, camphor substitute, solid rocket propellent and solvent for mitrocellulose and cellulose acetate.	U088	Aromatic Hydrocarbon	Diethyl Phthalate Ethyl Phthalate
		Primarily used as a fungicide and in various organic synthesis reactions.	U127 K016 K030 K085 F024 K018 K042	Aromatic Hydrocarbon	Hexachlorobenzene Perchlorobenzene
		Used as a heat-transfer liquid, hydraulic fluid and solvent for various elastomers.	U128 K030 K016 K018	Aromatic Hydrocarbon	Hexachlorobutadine

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
286	Industrial Organic Chemicals	The possible by-products of various industrial organic synthesis reactions utilizing furan as a feedstock.	F021 F022 F026 F027 F028	Aromatic Hydrocarbon	Hexachlorodibenzofuran
		The possible by-products of various industrial organic synthesis reactions utilizing furan as a feedstock.	F020 F021 F023 F026 F027 F028	Aromatic Hydrocarbon	Pentachlorodibenzo Furan
2865	CYCLIC CRUDES,DYES & ORGANIC PIGMENTS	By-products from the manufacture of dyes and pharmaceuticals.	U006	Acid Halide	Acetyl chloride Ethanoyl chloride
		By-products from the manufacture and waste treatment of photographic chemicals, quarternay (ammonium) agents, perfume, dyes, and pharmaceuticals.	U157 P028 K015 K085	Acid Halide	Benzyl chloride 3,4-benzacridine
		Spent laboratory reagents. By-product from manufacture of fertilizers, dyes, embalming fluids, disinfectants, and germicides.	U122 K009 K010 K038 K040	Aldehyde	Formaldehyde Methylene oxide
		Possible by-products from the manufacture of dyes, and agricultural chemicals.	U167	Amine	1-naphthylamine
		Possible by-products from the manufacture of dyes, and agricultural chemicals.	U168	Amine	2-naphtylamine
		By-products from the manufacture of rubber and certain dyes such as microscopy stains.	U021	Amine	Benzidine (1,1-biphenyl)-4,4 diamine
		By-products from the manufacture of pharmaceuticals, dyes, and agricultural chemicals.	P024	Amine	P-Chloroaniline Benzenamine
		Used in the manufacture of dye intermediate and toluene-2,4 diisocyanate.	U221 K027	Amine	Toluenediamine Diaminotoluene

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
2865	CYCLIC CRUDES,DYES & ORGANIC PIGMENTS	Used in insecticides, fumigants, gold and silver ore processing. Spent analytical chemistry reagent.	U191 K026	Nitrogen Compound	2-picoline 2-methyl-pyridine
		Primarily used in dye production, gasoline, medicines, and corrosion inhibitors.	P077 K083 F004 K103 K104	Nitrogen Compound	P-nitro benzene 4-nitro-benzamine
		Spent solvent. By-product from manufacture of various vitamins, drugs, dyes, fungicides.	U196 K026 F005	Nitrogen Compound	*Pyridine*
		Possible by-products from the manufacture of gold and silver processing, electroplating, hydrocyanic acid, insecticides, dyes, pigments, and chelating agents.	P106	Nitrogen Compound	Sodium cyanide
		Possible by-products from the manufacture of drugs, dyes, resins, photographic chemicals, and as an analytical reagent.	U219	Nitrogen Compound	Thiourea Thiocarbamide
		Used in the manufacture of pigments, ceramic enamels, insecticides, rodenticide, and herbicide.	P012	Oxygen Compound	Arsenic trioxide Arsenic (III) oxide
		By-products from the manufacture of pigments, corrosion inhibitors, and coating for light weight metals.	U032	Oxygen Compound	Calcium chromate
		By-products from the manufacture of dyes and fungicides.	U197	Oxygen Compound	P-Benzoquinone 1,4-cyclohexadiene dione
		Possible by-products from the manufacture of sulfuric acid, glass, photographic developer, and dyed textiles.	P120	Oxygen Compound	Vanadium pentoxide Vanadium (V) oxide
		Possible by-products from the manufacture of pharmaceuticals, resins, dyes, and pesticides.	U130 F024 K032 K033 K034	Hydrocarbon	Hexachlorocyclopentadiene

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
2865	CYCLIC CRUDES,DYES & ORGANIC PIGMENTS	Primarily used as a preservative in gums, glues, inks, paints, textiles, and leather goods.	U039 K001	Hydrocarbon	P-chloro-m-cresal 4-chloro-3-methyl phenol
		By-products of the manufacture of various dyes and explosives.	U105	Aromatic Hydrocarbon	2,4-Dinitrotoluene
		Used in the manufacture of dyes, explosives, and teluidines.	U106 K025	Aromatic Hydrocarbon	2,6 dinitrotoluene
		Used in the manufacture of various dyes, pigments, and urethane plastics.	U073	Aromatic Hydrocarbon	3,3-Dichlorobenzidine
		Used in the manufacture of various dyes.	U091	Aromatic Hydrocarbon	3-3' dimethoxybenzidine Dianisidine
		Used in the manufacture of synthetic dye.	U023 K015	Aromatic Hydrocarbon	Benzotrichloride Toluene trichloride
		Used in the manufacture of nitro cellulose lacquers and elastomers, insecticides, inks, adhesives, and solid rocket propellent.	U069	Aromatic Hydrocarbon	Di-n-butyl phthalate DBP
		Spent organic solvent, by-product from the manufacture of various dyes, insecticides, and metal polishes.	U070 F002 F024 K042 K085 K105	Aromatic Hydrocarbon	1,2-dichlorobenzene O-dichlorobenzene
		Spent organic laboratory reagent. By-product from the manufacture of various dyes, pharmaceuticals, and phenol-based compounds. Spent solvent.	U188 K021 K001 K087	Aromatic Hydrocarbon	Phenol Carbolic acid
		Possible by-products from the manufacture of dyes, medicines, perfumes, and various organic laboratory reagents.	U190	Aromatic Hydrocarbon	Phthalic acid esters
		Spent solvent. Fuel additive. By-products from manufacture of resins, coatings, dyes, and explosives.	U220 K015 F005 K036 K037 F024	Aromatic Compound	Toluene Methyl benzene

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
2869	OTHER INDUSTRIAL ORGANIC CHEMICALS	Spent organic solvent. By-product from the manufacture of varius isocyanates, carbonates, chloroformates, pesticides, and herbicides.	P095	Acid Halide	Phosgene
		By-products from the manufacture and waste treatment of acrylic polymers and various semiconductive polymers.	U009 K011 K013	Nitrile	Acrylonitrile Propenonitrile
		Distillation bottoms and by products from production of acetaldhyde from ethylene.	U001	Aldehyde	Acetaldhyde Acetic aldehyde
		By-products from the manufacture and waste treatment of various pharmaceuticals, herbicides, and polymers, especially polyurethane and polyester resins.	P003	Aldehyde	Acrolein Acrylic aldehyde
		By-products from the manufacture of insecticides such as DDT.	U034	Aldehyde	Chloral Trichloroacelaldehyde
		Spent laboratory reagents. By-product from manufacture of fertilizers, dyes, embalming fluids, disinfectants, and germicides.	U122 K009 K010 K038 K040	Aldehyde	Formaldehyde Methylene oxide
		Spent non-halogenated solvents; spent cleaning or spinning solvent; spent paint, laquor, or varnish remover.	U002	Ketone	Acetone 2-propanone
		Spent solvent. Spent organic laboratory reagent. Spent paint and wax remover.	U159 F005	Ketone	Methyl ethyl ketone 2-butanone
		By-products from the manufacture of agricultural chemicals, rocket fuels, and metal plating solutions.	U133	Amine	Hydrazine Diamine
		By-products from the manufacture of various jet and rocket fuels.	U098	Nitrogen compound	1,1-dimethyl hydrazine
		Primarily used as a non-nutritive sweetner fround in syrups, medicines, soft drinks, and dietic foods.	U202	Nitrogen Compound	Saccharin O-benzosulfimide

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
2869	OTHER INDUSTRIAL ORGANIC CHEMICALS	Manufacturing by-products and the treatment of viscone rayon, cellophane, and veterinary medicines.	P022 F005	Sulfur Compound	CARBON DISULFIDE CARBON BISULFIDE
		By-products from the manufacture of several glycols, surfactants and rocket propellant.	U115	Oxygen Compound	Ethylene oxide 1,2-epoxy ethane
		Used as a fuel additive.	P110	Organometallic Comp.	Tetraethyl lead
		Spent refrigerant and metal degreasing solvents. By-products from the manufacture and waste treatment of various semiconductors.	U211 F001 F002 K016 K020 F024 K019 K021 K073	Hydrocarbon	Carbon tetrachloride Tetrachloromethane
		Primarily used as an insecticide for cotton and tobacco crops.	U061	Hydrocarbon	DDT Dichlorodiphenyltrichloro-
		Spent refrigerent.	U075 F001	Hydrocarbon	Dichlorodifluoromethane Freon 12
		Spent dry cleaning solvent. Spent degreaser. By-product of manufacture of flourocarbons.	U210 F024 F001 K019 F002 K020 K085	Hydrocarbon	Tetrachloroethylene Perchloroethylene
		Possible by-products from the manufacture of dyes, medicines, perfumes, and various organic laboratory reagents.	U190	Aromatic Hydrocarbon	Phthalic acid esters
287	Agricultural Chemicals	Used as an alloy additive, in storage batteries, in various pigments, in fungicides, and in various photographic chemicals.	F006 K069 K061 K100	Cationic Compound	Cadium

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
287	Agricultural Chemicals	Primarily used as a herbicide.	F027	Acid	2-(2,4,5,-Trichlorophenoxy) Silvex
		Possible by-products from the manufacture of dyes, and agricultural chemicals.	U167	Amine	1-naphthylamine
		Possible by-products from the manufacture of-dyes, and agricultural chemicals.	U168	Amine	2-naphtylamine
		Possible by products from the manufacture of fubber, dyes, photographic chemicals, explosives, herbicides, fungicides and petroleum refining.	U012 K083 K103 K104	Amine	Aniline Phenylamine
		By-products from the manufacture of agricultural chemicals, rocket fuels, and metal plating solutions.	U133	Amine	Hydrazine Diamine
		By-products from the manufacture of pharmaceuticals, dyes, and agricultural chemicals.	P024	Amine	P-Chloroaniline Benzenamine
		Possible by-products from the manufacture of pharmaceutical products as well as pesticides and disinfectants.		Nitrogen Compound	4-Hydroxylaminoquinoline N-Oxi
		Used in the manufacture of various fungicides and rubber.	P049	Sulfur Compound	2, 4 - Dithiobiuret Biuret
		Primarly used as a herbicide on a variety of vegetation.		Sulfur Compound	Aramite 2-(p-t-butylphenyloxy) isaprop
		Used in synthesis of methionine, as a jet fuel additive, and as a fungicides.	U153	Sulfur Compound	Methanethial Methyl Mercaptan
		Used as a broad range systemic insecticide during World War I.	P070	Hydrocarbon	2-Methyl-2-(methylthio)-propio Aldicarb
		Used as a fumigant and disinfestant of various domestic crops.	U029	Hydrocarbon	Bromomethane Methyl bromide

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
287	Agricultural Chemicals	Possible by-products from the manufacture of insecticides, dyes, and inks.	P038	Hydrocarbon	Diethylarsine
		Primarily used in a broad range of insecticides affecting flies, cockroaches, grasshoppers and boll weevils.	U129 F024	Hydrocarbon	Hexachlorocyclohexane Benzene Hexachloride
		Primarily used as an insecticide and acaricide.	U142	Hydrocarbon	Kepone Decachlorooctahydro-1,3,4-Meth
		Primarily used as an insecticide, germicide, dye and pharmaceutical intermediate and as soil fumigant.	U072 F024	Aromatic Hydrocarbon	1,4-Dichlorobenzene PDB
		Primarily used as an insecticide on citrus crops.		Aromatic Hydrocarbon	2-Cyclohexyl-4,6-Dinitrophenol
		Primarly used as a herbicide.		Aromatic Hydrocarbon	2-sec-Butyl-4,6-dinitrophenol Dinoseb
		Used in the manufacture of medicines, and as a catalyst in various polymerization processes.	P036	Aromatic Hydrocarbon	Dichlorophenylarsine
		Possible by-products from the manufacture of insecticides, plastics camphore substitute, solid rocket propellent and solvent for nitrocellulose and cellulose acetate.	U088	Aromatic Hydrocarbon	Diethyl Phthalate Ethyl Phthalate
		Primarily used as a pesticide.		Aromatic Hydrocarbon	Heptachor Epoxide
		Possible by-products from the manufacturer of such herbicides as 2,4,5-T.	F021 F022 F023 F027 F028 F026	Aromatic Hydrocarbon	Hexachlorodibenzo-P-Dioxin
		Possible By-products from the manufacture of various herbicides and defoliants.		Aromatic Hydrocarbon	Pentachlorobenzene

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
287	Agricultural Chemicals	Possible By-products from the manufacture of such herbicides as 2,4,5-T.	F020 F021 F022 F023 F026 F027 F028	Aromatic Hydrocarbon	Pentachlorobenzo-P-Dioxin
		Possible by-products from the manufacture of such herbicides as 2,4,5-T.	F020 F021 F022 F023 F026 F027 F028	Aromatic Hydrocarbon	Tetrachlorodibenzo-P-Dioxin
289	MISCELLANEOUS CHEMICALS	Primarily used as a preservative in gums, glues, inks, paints, textiles, and leather goods.	U039 K001	Hydrocarbon	P-chloro-m 4-chloro-3-methyl phenol
		Used in the production of explosives, medicines, and rocket propellants.	P081	Nitrogen Compound	Nitroglycerine Trinitrate 1,2,3-propanetrial
		Possible by-products from the manufacture of insecticides, dyes, and inks.	P038	Hydrocarbon	Diethylarsine
		By-products of the manufacture of various dyes and explosives.	U105	Aromatic Hydrocarbon	2,4-Dinitrotoluene
		Used in the manufacture of explosives, photographic developer and dyes.	P048 K001	Aromatic Hydrocarbon	2-4 dinitrophenol
		Used in the manufacture of nitro cellulose lacquers and elastomers, insecticides, inks, adhesives, and solid rocket propellent.	U069	Aromatic Hydrocarbon	Di-n-butyl phthalate DBP
		Spent solvent. Fuel additive. By-products from manufacture of resins, coatings, dyes, and explosives.	U220 K015 F005 K036 F024 K037	Aromatic Compound	Toluene Methyl benzene

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
2892	Explosives	Possible by products from the manufacture of rubber, dyes, phtographic chemicals, herbicides, fungicides and petroleum refining.	U012 K083 K103 K104	Amine	Aniline Phenylamine
		Used in the manufacture of various explosives.		Hydrocarbon	Trinitrobenzene TNB
29	PETROLEUM REFINING & RELATED INDUSTRIES	By-products from the manufacture of cellulose acetate, resins, perfumes, plastics, rubbers and solid rocket propellants.	U102	Aromatic Hydrocarbon	Methyl phthalate
		By-product from the manufacture of rocket fuels and various flourocarbons.	P056	Anionic Compound	Flourine
		Used in the manufacture of various alloys, gasoline, storage batteries, ammunition, solder and pipe.	K002 K046 K051 K069 K003 K048 K061 K086 K005 K049	Cationic Compound	Lead
		Used in the manufacture of various alloys, gasoline, storage batteries, ammunition, solder and pipe.	K062	Cationic Compound	Lead
		Distillation bottoms and by-products from production of acetaldhyde from ethylene. fami	U001	Aldehyde	Acetaldhyde Acetic aldehyde
		Spent non-halogenated solvents; spent cleaning or spinning solvent; spent paint, laquer, or varnish remover.	U002	Ketone	Acetone 2-propanone
		By-products from the manufacture of agricultural chemicals, rocket fuels, and metal plating solutions.	U133	Amine	Hydrazine Diamine

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
29	PETROLEUM REFINING & RELATED INDUSTRIES	By-products from the manufacture of various jet and rocket fuels.	U098	Nitrogen Compound	1,1-dimethyl hydrazine
		By-products from the manufacture of jet and rocket fuel, and photographic chemicals.	U099	Nitrogen Compound	1,2 dimethyl hydrazine
		Used in the production of explosives, medicines, and rocket propellants.	P081	Nitrogen Compound	Nitroglycerine Trinitrate 1,2,3-propanetrial
		Primarily used as a rocket fuel and analytical chemistry reagent.	P112	Nitrogen Compound	Tetranitromethane
		By-products from the manufacture of several glycols, surfactants and rocket propellant.	U115	Oxygen Compound	Ethylene oxide 1,2-epoxy ethane
		Spent organic solvent. Gasoline compnent. By-products from the manufacture of carbon tetrachloride, and various gums, waxes, and resins.	U083 F024	Hydrocarbon	1,2-dichloropropane Propylene dichloride
		Spent refrigerant and metal degreasing solvents. By-products from the manufacture and waste treatment of various semiconductors.	U211 F001 F002 K016 K020 F024 K019 K021 K073	Hydrocarbon	Carbon tetrachloride Tetrachloromethane
		Various spent refrigerants and propellants. By-products from the manufacture of insecticides and fluorocarbon plastics. Spent analytical laboratory reagents.	U044 K009 K010 K019 K020 K021 K029 K073	Hydrocarbon	Chloroform Trichloromethane
		A combustible by-product of coal tar.	U120 K035 K001	Hydrocarbon	Fluoranthene

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
29	PETROLEUM REFINING & RELATED INDUSTRIES	Spent organic solvent. By-product from manufacture of vinyl chloride, soaps, chelating agents, degreasers, and anti-knock gasoline.	U077 F024 K018 K029 K096	Hydrocarbon	L,2-dichloroethane Ethylene dichloride
		Spent organic solvent. By-product from the manufacture of perfumes, lacquers, and thermoplasitcs.	U079	Hydrocarbon	L,2-dichloroethylene Acetylene chloride
		Spent organic solvents. By-product from the manufacture of perfumes, lacquers, and thermoplastics.	U078 K073 F024	Hydrocarbon	L,l-dichloroethylene Vinylidene chloride
		Possible emissions from coke quench towers and asphalt hot mix plants and from combustion of coal or oil.		Aromatic Hydrocarbon	7-H-Dibenzo (c,g) carbayole
		Possible by-products from the combustion of coal or other petroleum deriviatives.	U018 K001 K035	Aromatic Hydrocarbon	Benz (a) Anthracene
		Possible by-products from the combustion of coal or other petroleum derivatives.	U016	Aromatic Hydrocarbon	Benz (c) Acridine
		Possible by products from the combustion of various fuels such as coal and petroleum derviatives as well as tobacco.	K001 K035	Aromatic Hydrocarbon	Benzo (b) Fluoroanthene
		Possible by products from the combustion of various fuels such as coal and petroleum derviatives as well as tobacco.		Aromatic Hydrocarbon	Benzo (j) Fluoroanthene
		Possible distillation by-products of phenol, chloronitro benzene, and aniline. Spent pesticide intermediates.	U037 F001 F002 F024 K015 K105	Aromatic Hydrocarbon	Chlorobenzene Phenyl chloride
		Used in the manufacture of nitro cellulose lacquers and elastomers, insecticides, inks, adhesives, and solid rocket propellent.	U069	Aromatic Hydrocarbon	Di-n-butyl phthalate DBP

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
29	Petroleum and Coal Products	Structural isomer of Dibenz (a,h) aceridine. See that listing.		Aromatic Hydrocarbon	Dibenz (a,j) aciridine
		Possible by products from the combustion of various fuels such as coal and petroleum derviatives as well as tobacco.		Aromatic Hydrocarbon	Dibenz (a,h) aciridine
291	Petroleum Refining	Possible by products from the manufacture of rubber, dyes, photographic chemicals, explosives, herbicides, fungicides and petroleum refining.	U012 K083 K103 K104	Amine	Aniline Phenylamine
30	RUBBER & MISC.	By-products from the manufacture of cellulose acetate, resins, perfumes, plastics, rubbers, and solid rocket propellants.	U102	Aromatic Hydrocarbon	Methyl phthalate
		Possible by-products from the manufacture of medicines (sedative), oils, waxes, rubber, solvents, leather.	U182 K009 K010 K026	Aldehyde	Paraldehyde 2,4,6 trimethyl1-1,3,5-trioxan
		Possible by-products form the manufacture of pharmaceuticals, dyes, rubber, polyester resins, and fungicide.	U166 K024	Ketone	1,4-Naphthoquinone 1,4-naphthalenedione
		By-products from the manufacture of rubber and certain dyes such as microscopy stains.	U021	Amine	Benzidine (1,1-biphenyl)-4,4 diamine
		By-products from the manufacture of insecticides, pharmaceuticals, disinfectants, solvents, rubber, and gasolines.	U101 K001	Aromatic Hydrocarbon	2,4 dimethyl phenol Xylenol
31	LEATHER & LEATHER PRODUCTS	Primary use is in the manufacture of insecticides, tanning agents, and rubber.	U053	Aldehyde	Crotonaldehyde 2-butenal
		Used in the leather tanning and in manufacturing adhesives and polyester.	U126	Aldehyde	Glycidylaldehyde
		Possible by-products from the manufacture of medicines (sedative), oils, waxes, rubber, solvents, leather.	U182 K009 K010 K026	Aldehyde	Paraldehyde 2,4,6 trimethyl1-1,3,5-trioxan

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
31	LEATHER & LEATHER PRODUCTS	Used in the production of parathion, fungicide (leather), and various organic synthesis reactions.	U170	Nitrogen Compound	4-nitrophenol
		Possible by-product from the manufacture of medicines, insecticides, and leather tanning. Chemical family is substituted hydro	P075	Nitrogen Compound	Nicotine and salts
		Primarily used as a preservative in gums, glues, inks, paints, textiles, and leather goods.	U039	Hydrocarbon	P-chloro-m-cresal 4-chloro-3-methyl phenol
		Possible by-products from the manufacture of various resins, dyes, pharmaceuticals, adhesives, medicines, and rubber.	U201	Aromatic Hydrocarbon	Resorcinol Resorcin
2	Stone, Clay & Glass Products	Primarily used as an alloy additive, in various glasses, pesticides, and various photoelectric applications.		Cationic Compound	Thallium
		Used in the manufacture of various arsenates, and glass. Used as a wood preservative and vegetation defoliant.	P010	Acid	Arsenic acid Orthoarsenic acid
		Primarily used in the manufacture of pyrotechnics, ceramics, glass and paper.	P107	Sulfur Compound	Strontium sulfide
		Used in the manufacture of dyes, textiles, glass, photographic developer and as a catalyist in many organic reactions.	P119	Oxygen Compound	Vanadic Acid Vanadium pentoxide
	Primary Metal Industries	Primarly used alon or as an additive to light weight, high strenght alloys and as an additive to solid propellant rocket fuel.	P015	Cationic Compound	Berylluim
		Primarily used as an alloy additive to metals to add corrosion and high temperature resistance and in manufacture of inorganic pigment.	K002 K006 K049 K003 K004 K050 K051 K007	Cationic Compound	Chromium

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
33	Primary Metal Industries	Primarily used as an alloy additive to metals to add corrosion and high temperature resistance and in the manufacture of inorganic pigment.	K008 K061 K005 K048 K062 K069 K100	Cationic Compound	Chromium
		Used in the manufacture of various alloys, gasoline, storage batteries, ammunition, solder pipe.	K002 K046 K051 K069 K003 K048 K061 K086 K005 K049	Cationic Compound	Lead
		Used in the manufacture of various alloys, gasoline, storage batteries, ammunition, solder pipe.	K062	Cationic Compound	Lead
		Primary used as an alloy aditive, protective coating, in storage batteries and fuel cells and in ceramics.		Cationic Compound	Nickel
		Primarily used in the production of electronic equipment, steel, copper, and rubber.		Cationic Compound	Selenuim
		Possible by-products from the manufacture of photographic chemicals, electrical equipment, jewelry, medicines, and various alloys.		Cationic Compound	Silver
		Primarily used as an alloy additive, in various glasses, pesticides and various photoelectic applications.		Cationic Compound	Thallium
		Primarily used as a systematic insecticide.	P085	Amide	Octamethylpyrophosphoramide Schradan
		Primarily used in organic synthesis reactions and as a leaching agent for gold.	U149	Nitrile	Malononitrile Propanedinitrile

OSWER Policy Directive No. 9487.01-A(85)

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
33	PRIMARY METAL INDUSTRIES	Used in various electroplating solutions.	P013	Nitrogen Compound	Barium Cyanide
		By-products from electroplating copper and inorganic synthesis involving the cyanide ion.	P029	Nitrogen Compound	Copper cyanide Cupric cyanide
		Primarily used in metalurgy and electroplating industries.	P074 F006	Nitrogen Compound	Nickel cyanide
		Used in insecticides, fumigants, gold and silver ore processing. Spent analytical chemistry reagent.	P098	Nitrogen Compound	Potassium cyanide
		Primarily uses are in medicine and silver plating.	P104	Nitrogen Compound	Silver cyanide
		Possible by-products from the manufacture of gold and silver processing, electroplating, hydrocyanic acid, insecticides, dyes, pigments, and chelating agents.	P106	Nitrogen Compound	Sodium cyanide
		Used in the manufacture of medicine, plated metal, and insecticides. Spent chemical reagent.	P121	Nitrogen Compound	Zinc cyanide
		Used in the manufacture of medicine and processing of various ores.	U214	Organometallic Comp.	Thallium acetate Thallous acetate
		Spent refrigerant and metal degreasing solvents. By-products from the manufacture and waste treatment of various semi-conductors.	U211 F001 F002 K016 K020 F024 K019 K021 K073	Hydrocarbon	Carbon tetrachloride Tetrachloromethane
		Spent organic solvent, by-product from the manufacture of various dyes, insecticides, and metal polishes.	U070 F024 K085 K105	Aromatic Hydrocarbon	1,2-dichlorobenzene O-dichlorobenzene

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SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
3331	Primary Copper Industries	Used in the manufacture of various lead and copper alloys, solid state electronic products, and medicine.	K031 K101 K084 K102 K060	Cationic Compound	Arsenic
		Primarly used as a copper additive, in vacuum tubes and in spark plug alloys.		Cationic Compound	Barium
3332	Primary Lead Industries	Primarly used in the production of lead alloys, storage batteries, and various semiconductor components.	K021	Cationic Compound	Antimony
		Used in the manufacture of various lead and copper alloys, solid state electronic products, and medicine.	K031 K101 K084 K102 K060	Cationic Compound	Arsenic
36	Electric and Electronic Equipment	Primarly used as a copper additive, in vacuum tubes and in spark plug alloys.		Cationic Compound	Barium
		Primarily used in the production of electronic equipment, steel, copper, and rubber.		Cationic Compound	Selenium
		Possible by-products from the manufacture of photographic chemicals, electrical equipment, jewelry, medicines, and various alloys.		Cationic Compound	Silver
		Spent organic intermediate. Spent doping agent for solid state electronic components.	P096	Acid	Phosphine Hydrogen Phosphide
		Spent solvent and dielectric fluids.	P101	Nitrile	Ethyl cyanide Propanenitrile
		Spent solvents. Found in dielectric fluids and electrical insulation.	U207 K085 F024	Aromatic Hydrocarbon	Tetrachlorobenzene
362	Electrical Industrial Apparatus	Possible by-products from the manufacture of fungicides, bactericides, pulp and paper, electrical apparatus, pants, and pharmaceuticals.	K071 K106	Cationic Compound	Mercury Quicksilver

OSWER Policy Directive No. 9487.01-A(85)

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
367	Electronic Components & Accesrs	Used in the manufacture of various lead and copper alloys, solid state electronic products, and medicine.	K031 K101 K084 K102 K060	Cationic Compound	Arsenic
3674	Semiconductors and Related Devices	Primarly used in the production of lead alloys, storage batteries, and various semiconductor components.	K021	Cationic Compound	Antimony
3691	Storage Batteries	Primarly used in the production of lead alloys, storage batteries, and various semiconductor components.	K021	Cationic Compound	Antimony
		Used as an alloy additive, in storage batteries, in various pigments, in fungicides, and in various photographic chemicals.	F006 K069 K061 K100	Cationic Compound	Cadium
		Used in the manufacture of varous alloys, gasoline, storage batteries, ammunition, solder pipe.	K002 K046 K051 K069 K003 K048 K061 K086 K005 K049	Cationic Compound	Lead
		Used in the manufacture of various alloys, gasoline, storage batteries, ammunition, solder pipe.	K062	Cationic Compound	Lead
		Primary usec as an alloy additive, protective coating, in storage batteries and fuel cells and in ceramics.		Cationic Compound	Nickel
38	MEASURING, ANALYZING & CONTROLING INSTMTS	By-products from the manufacture and waste treatment of photographic chemicals, quarternay (ammonium) agents, perfumes, dyes and pharmaceuticals.	P028 U157 K015 K085	Acid Halide	Benzyl chloride 1-chlorotoluene

OSWER Policy Directive No. 9487.00-0001

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
38	MEASURING, ANALYZING & CONTROLING INSTMTS	By-products from the manufacture of various jet and rocket fuels.	U098	Nitrogen Compound	1,1-dimethyl hydrazine
		By-products from the manufacture of jet and rocket fuel, and photographic chemicals.	U099	Nitrogen compound	1,2 dimethyl hydrazine
		Primarily used in the manufacture of photographic chemicals, rodenticides, and various ketones.	P116	Nitrogen Compound	Thiosemicarbayide Aminothiourea
		Used in organic synthesis reactions and production of photographic chemicals. Spent micro laboratory reagent.	P087	Oxygen Compound	Osmium tetroxide
		Spent degreaser. Spent organic laboratory reagent. By-product in manufacture of various insecticides and photographic films.	U208 F024 K012 K019 K020 K030 K095	Hydrocarbon	1,1,1,2-tetrachloroethane
		Spent degreaser. Spent organic laboratory reagent. By-product in the manufacture of various insecticides and photographic films.	U209 K019 K020 K030 K073 K095	Hydrocarbon	1,1,2,2-tetrachloroethane Acetylene tetrachloride
		Used in the manufacture of explosives, photographic developer and dyes.	P048 K001	Aromatic Hydrocrbon	2-4 dinitrophenol
91	Jewelry, Silverware & Plated Ware	Possible by-products from the manufacture of photographic chemicals, electrical equipment, jewelry, medicines, and various alloys.		Cationic Compound	Silver
95	Sanitary Services	Possible constituent of industrial sewage sludge.		Acid	Benzenarsonic Acid
xxx	- Unknown -	Spent solvent. Spent degreaser.	K017		1,2,3 Trichloropropane Allyl trichloride

OSWER Policy Directive No. 9487.01-A(85)

SIC#	INDUSTRY NAME	WASTE DESCRIPTIONS	WASTE CODES	CHEMICAL FAMILY	COMPOUND NAMES / SYNONYM
XXXX		Acts as an important element in plating or alloying metals for corrosion resistance.	**		Chromium and compounds
		Spent solvent.	K017		Dichloropropanol alpha-dichlorohydrin
		By-products from the manufacture of various medicines.	**		Diisopropylfluorophosphate DFP
		Primarily used in the production of dyes and as a camphor substitute in celluloid.	K025		Dinitrobenzene
		Used in the manufacture of dyes, photographic chemicals,and various organic synthesis reactions.	K083 K103 K104		Phenylenediamine Benzenediamine
			**		Phosphorotic acid
		Spent solvent. By-products from the manufacture of dyes, dielectric fluids, lubricants, and insecticides.	F024 K085		Trichlorobenzene
			U097	Acid Halide	Dimethyl Carbonyl Chloride
		By-products from the manufacture and treatment of epichlorohydrin; certain synthetic pharmaceuticals, and adhesives.	K024	Hydrocarbon	Allyl chloride 3-Chloropropene
		A complex organic produced by various molds and fungus, espically those found on many vegetables.		Hydrocarbon	Aziatoxins
			U063 K001	Aromatic Hydrocarbon	Dibenz (a,h) anthracene

OSWER Policy Directive No. 9487.01-A(85)

APPENDIX C

POTENTIAL SOURCES OF INFORMATION ON THE LOCATION OF AQUIFERS IDENTIFIED AS UNDERGROUND SOURCES OF DRINKING WATER

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